$4.00 a Year Published Monthly 50c a Copy

APR 21 1945

VETERINARY MEDICINE

MAY 1945

CONTENTS

Veterinary Progress, Policies and Comment.....145-147

Norway Rat Can Spread Coccidiosis, 145; Air-Borne Infections Reduced by Triethylene Spray, 145; Rescue Thousands of Animal Air Raid Victims, 145; Compulsory Vaccination Against Epizootic Abortion, 145; Human Albumin Delays Excretion Rate of Penicillin, 145; Army Mules Bring High Prices in China, 146; Veterinary Examination May Save Owner Expense, 146; Veterinary Service Vital, 146; Cost of Mastitis in Illinois, 147; Laws on Brucellosis Control Must Be Changed, 147.

Veterinarians' Opportunities Under "G I Bill of Rights"..148

Reminiscences 149

Wartime Feeding of Livestock.....152

New Method of Cropping Dogs' Ears.....159

Vitamin A Deficiency in Cattle.....163

Clinical Reports 168-171

Six Years with Hog Cholera Vaccine, 168; Treatment of Azoturia with Vitamin B_1, 169; Coryza in Chickens, 169; Quick Recoveries in Azoturia, 170.

Abstracts 172-175

Improvement in Poultry Meat Urged, 172; Liability for Sale of Unwholesome Food, 172; Sulphamethazine in Coccidiosis in Chickens, 173; Dried Cow Manure and Rumen Contents in Poultry Rations, 173; Milk and Tapeworms in Chickens, 174; Preparation of Normal Saline Solution, 174; Unusual Dystocia in Swine, 174; Effective Uses of Penicillin, 174; Treatment for Induced Shock in Dogs, 175; Mineral Deficiencies in Farm Animals, 175.

Book Reviews 176-177

Introduction to Parasitology, 176; The March of Medicine, 176; Speed in Animals, 177; Statistical Methods of Research Workers, 177.

Bulletins, Circulars, Reprints, Etc.....178

VOL. XL
No. 5

Entered as second-class matter Nov. 8, 1920, at the post office at Chicago, Ill., under the Act of March 3, 1879.

7632 S. Crandon Ave.
Chicago 49, U.S.A.

Week by week, more and more good veterinarians specify

Jen-Sal

Jen-Sal

ANTI-HOG CHOLERA SERUM AND HOG CHOLERA VIRUS

Products that symbolize True Professionalism

They like Jen-Sal's ultra-attractive round container, with metal top and bottom—a package that minimizes breakage and prolongs refrigeration. They like Jen-Sal Hog Cholera Virus—purity tested and bottled in clear, hard, borosilicate glass.

They like to centralize purchases as, in addition to Anti-Hog Cholera Serum and Virus, a well stocked chain of Jen-Sal Shipping Depots carry complete lines of all supplies needed to conduct modern veterinary practice—products available to veterinarians only.

Jensen-Salsbery Laboratories, Inc.

Kansas City 10, Missouri

For Successful Vaccination Specify Jen-Sal

VETERINARY MEDICINE

Registered in U. S. Patent Office

VOL. XL MAY, 1945 No. 5

Published Monthly by the
VETERINARY MAGAZINE CORPORATION
7632 S. CRANDON AVE., CHICAGO 49, ILL., U.S.A.

$4.00 a year; per copy 50 cents; Special Issues $1.00

All matter appearing in this publication is copyrighted. No part of it may be reproduced without specific permission. Permission will be given if the purpose is unobjectionable. If there be any question as to the propriety of reproduction the author will be consulted.

Entered as second-class matter Nov. 8, 1920, at the post office at Chicago, Ill., under the Act of March 3, 1879. Entered as second-class matter under the title of American Journal of Veterinary Medicine July 19, 1910, at Chicago, Ill., under the Act of March 3, 1879.

D. M. CAMPBELL, *Editor*
7632 S. Crandon Ave., Chicago 49, Ill.
Telephone South Shore 7160

H. J. MOSTYN, *Eastern Representative*
P. O. Box 121, Sussex, New Jersey
Telephone Sussex 2F18

COPYRIGHTED, 1945, BY VETERINARY MAGAZINE CORPORATION

It has been established by E. F. Waller, poultry pathologist at the University of New Hampshire that the common brown or Norway rat can cause the spread of infectious bronchitis and coccidiosis.

Duck and turkey embryos are reported to be superior to chicken embryos for the growth of rickettsias for the preparation of typhus vaccine. The yield from eggs of either species being approximately five times that obtained from hen eggs.

An acidophilus milk paste, quite effective in the healing of wounds, has been developed by Soviet microbiologists. This milk paste has proved successful in Leningrad hospitals in slow healing wounds which failed to respond to novocaine blocking, ultraviolet ray treatment, antiseptics or permanganate baths.

The bacteria in the air of men's dormitories at Northwestern University was reduced greatly and hemolytic streptococci were practically eliminated by spraying with triethylene glycol. This treatment of the air reduced the incidence of air-borne infections—colds, tonsilitis, pneumonia, acute sinusitis more than 50% and limited the spread of mumps and measles almost as much.

In experiments with pilchard and dogfish meals the division of chemistry and poultry, Washington agricultural experiment station, observed that there were no significant changes in the gross protein value of fishmeals after 10 months storage regardless of the method of processing or treatment or the type of container. The wet-process dogfish meal had a higher nutritive value than the dry dogfish meal.

Over 2,000 years ago, Aristotle advised the eating of liver to prevent night blindness.

Clark, of the Wisconsin experiment station, states that the milk of cows fed a ration of grass silage contained 25% more vitamin A than the milk of cows fed on corn silage.

As animals are not allowed in public air raid shelters in England, at the height of the London raids, 7241 animals which had been buried under debris were rescued in a single week.—*Sci. N. L.*

An Isle of Man Government order has been issued providing for compulsory vaccination of all female calves against epizootic abortion, in the hopes of eliminating this scourge from the island.—*Vet. Rec.*, 57:6, p. 67 (Feb. 10, '45).

Ornithosis, a disease of pigeons quite similar to psittacosis, is widely prevalent in the United States and is thought may be responsible for many sporadic cases of primary, atypical pneumonia in man. Levinson, Gibbs and Beardwood report (*J. Am. Med. Ass'n*, 12-23-44) six such cases in Philadelphia. All had been exposed to pigeons.

That a new combination of penicillin and albumin of human blood serum promises an increasing effectiveness in penicillin treatment, is announced by the Squibb Institute of Medical Research. In mice this compound of penicillin is excreted much more slowly than is the sodium salt of the drug. The effectiveness of penicillin is dependent upon its delayed excretion rate.

Army Mules Bring High Prices in China

Because of his part in the campaign as an American veterinary liaison officer attached to an army of the Chinese Expeditionary Force, Capt. Thomas J. Guilfoil, V.C., Kansas City, Kan., derived considerable personal satisfaction from the recent reopening of the Stilwell (Ledo-Burma) Road.

The Salween Campaign to open the northern part of this road was fought over some of the most rugged terrain in the world, including reaches of the Kaolikung mountain range, a spur of the Himalayas. Veterinary units played an important role in making possible the transportation of supplies to the fighting front over tortuous and dangerous mountain trails.

Signal Corps, U. S. Army
Captain Thomas J. Guilfoil and his interpreter

Good pack animals, because they were in constant demand, were hard to obtain and it took Captain Guilfoil a month of travel to buy 65 such animals.

"The average price per animal was $23,000 (Chinese currency). The highest price paid for a first class mule was $45,000," the captain relates. "Some mules were priced as high as $100,000 and were usually valued at about double the price of a horse of the same size and age.

"As a rule, a wooden pack saddle, bridle and related equipment cost about $2,500 to American buyers, but usually this equipment was thrown in free of charge when a Chinese did the bargaining.

"According to my interpreter, most of the Chinese who sold the horses and mules and used the money to purchase another wife."

Captain Guilfoil relates that one veterinarian went all the way to Tibet to buy pack animals, the trip requiring about five months. Some 1,500 animals were purchased in Tibet on this trip.

Captain Guilfoil, who was in the B.A.I. at East Saint Louis, Ill., prior to entering the Army in November, 1940, says the ideal pack load for China's narrow trails in the Salween sector is about 80 pounds, but that sometimes the load piled on a mule went as high as 120 pounds.

Prior to being ordered overseas, Captain Guilfoil was stationed at the Chicago Quartermaster Depot. He arrived in India in November, 1942, and in September of the following year was flown across the Himalayan "Hump" to China, where he was assigned to a unit of the Chinese Combat Command (then Y-Force).

The captain's wife, Ruth G., is a captain in the WAC.

A Veterinary Examination May Save an Owner Much Expense

Many brood mare owners send their mares a considerable distance to be bred to good stallions and this often involves a considerable expense either in freight, express or trucking which in many instances might be saved if the owner would make sure that the mare is in good breeding health before sending her to the stallion. We would advise every mare owner, unless he is positively certain about the breeding health of his mare, to have a competent and practical veterinary examination made of this mare several weeks before the time that she is to be bred.—*The Nat'l Horseman.*

Veterinary Service Vital

Webster defines "vital" as "essential to the continuance of life" and "necessary to life." Food, clothing and shelter are therefore vital necessities, and they are the only such necessities. Hence, veterinary service which provides conservation of the food supply by curing, preventing and eradicating animal diseases, and veterinary research are *vital*—necessary to the feeding and clothing of man.

Agriculture, including forestry, and veterinary medicine encompass just about all the vital necessities of man. Other industries and other sciences contribute to better and longer living, but they are not "vital," i.e., not essential to life—do not supply indispensable food, clothing or shelter.

Referring to the brucellosis control and eradication project *Prairie Farmer* (March 17) says: "Officialdom will get washed down the river of contempt unless it sets aside its whims and uses the methods of new science which farm practice has found practical and useful."

Cost of Mastitis in Illinois Equals Production of 55,000 Cows

In a preliminary survey made by the Department of Animal Pathology and Hygiene, University of Illinois, 30% of the dairy cows were found to have mastitis. There are more than eleven hundred thousand dairy cows in Illinois and even a 25% incidence of mastitis, which is regarded as conservative, would mean 275,000 affected cows. Estimating an average decrease of 20% in milk production as a result of the disease, these figures indicate that mastitis costs Illinois dairymen the equivalent of the total production of 55,000 cows. The University of Illinois has seven whole time veterinarians employed in a mastitis control demonstration project.

State Laws on Brucellosis Control Must Be Changed

This discussion* by Beach of the University of Wisconsin concerns only conditions in Wisconsin, but in the main the conditions differ only in degree in other states. Test and slaughter has apparently been the correct answer to the bovine brucellosis problem in some herds; in others it has been only a bill of expense. The author thinks dairymen have been misled into adopting it because a similar plan was successful in suppressing bovine tuberculosis. Radically different characteristics of the two diseases are mentioned: (1) Tuberculosis infection is permanent and any change in the infected animals is for the worse. Animals often recover from brucellosis and others become carriers and thereafter produce satisfactorily. (2) Infected animals are spreaders of brucellosis only at calving time and shortly afterward. Tuberculosis spreaders disseminate the infection continuously. The difference in the two tests and in the reactions to them also are discussed.

The peculiarity is mentioned that, although the udder is the reservoir of infection in carrier cows, these animals, like the infected, spread the disease only after calving and some apparently never spread the disease. Examples are given of the failure of udder infection to spread to other animals, even where intimate contact had been maintained for years.

"The removal of reactors from recently infected (active, or hot) herds and replacing them with susceptible animals is a scientifically unsound procedure. No one should have ever reasoned that the blood test could work with accuracy on this class of herds because a blood test applied to a herd while the disease is still spreading is almost sure not to detect all infected cattle, as some of them will not have had time to develop agglutins. This procedure has not only tended to prevent the quieting of these herds but has in some instances increased the number of reactors.

"The test never has, in Wisconsin at least, had a chance to show what it can do in the eradication of brucellosis.

"The disrepute into which the test has fallen is not the fault of the test itself but of its misuses. The worst misuse is the removal of reactors from actively infected herds; that is, herds in which the disease is still spreading, and replacing them with susceptible cattle. Most of these active herds are recently infected but not necessarily so.

"This test finds its best use in passive herds after all the animals have had time to develop agglutins.

"There is considerable evidence, both experimental and field, which indicates that Strain 19 used on adult, open cows in actively infected herds will materially hasten the time when the herd can be freed by means of the blood test. And while more experimental evidence is desirable, cows in active herds can be given worthwhile protection if Strain 19 is used before the hot strain is picked up. Why then is vaccination still withheld by law?

"Cows vaccinated with Strain 19 will, of course, react to the blood test; but in such herds they will do so anyway. As regards the use of Strain 19 in such herds we know of no possible damage that may be done; and all available evidence points to its effectiveness. To date, at least, there is no evidence known to the writer to show that vaccinated animals can spread Strain 19 to susceptible individuals.

"Control methods in the past have been largely based on the blood test. In the early years of the control program, cattle reacted only as a result of infection with the disease. Now that vaccination is practiced more or less promiscuously, this is definitely not so. Brucellosis vaccine is relatively easy to procure and the number of animals that by vaccination have been made to react has in the past few years increased materially. The payment of indemnity, in the manner in which it has been done in the past, and vaccination are incompatible."

*Beach, B. A. Will test and slaughter control Bang's Disease? *Hoard's Dairyman* 90:4, p. 113, 1945.

Veterinarians' Opportunities Under the "G.I. Bill of Rights"

Dr. H. L. Foust, chairman of the postwar planning committee of the A.V.M.A. suggests, that the educational privileges granted veterans of the present war by the Servicemen's Adjustment Act of 1944, Title II, Public 346, 78th Congress, be called to the attention of veterinarians in and out of the armed forces.

For purposes of qualifying for benefits under this Act veterans are classified as, (1) those who do not have a disability incurred in or aggravated by service in the armed forces in the present war for which a pension is payable under the law and (2) those who do have such a disability.

I. Those not having service connected disability must meet the following requirements to be eligible for the educational opportunities provided by the Act.

1. Must have served in the armed forces 90 days or longer (exclusive of any period in the Army Specialized Training Program or Navy College Training Program or any period during which he was assigned as a cadet or midshipman at one of the service academies) subsequent to Sept. 15, 1940, and prior to the end of the present war.

2. Must have been discharged or released from active military or naval service under conditions other than dishonorable.

The educational opportunities provided are of two classes: (1) For those 25 years of age or younger at the time they entered the military or naval service and (2) those more than 25 years of age when their service began.

1. Those not more than 25 years of age when they entered the military or naval service have the option of either of the following (a or b):

a. A refresher or training course for not longer than one year.

b. A regular course of study offered by an approved institution. Upon the satisfactory completion of one year's work of such course they become eligible for further education or training for three years (four years total).

2. Those more than 25 years of age when they entered the military or naval service are divided into two classes for benefits under the educational program. (a) Those whose education was not interrupted and (b) those whose education was delayed, impeded, interrupted or interfered with by their service.

a. Veterans more than 25 years of age at the time of entering the military or naval service and whose education was not interrupted by such service may receive not more than one year of education or training or a refresher or retraining course at an approved educational or training institution.

b. Veterans more than 25 years of age at the time of entering the service, whose schooling or training was interrupted by such service may receive the same benefits provided for those not more than 25 years of age.

A further limitation of the period of training is imposed by the duration of the veteran's service. Thus, for example, if he served in the armed forces but three months, he is entitled to a maximum of one year of schooling; if he served 12 months, to two years of schooling; if he served 24 months, to three years of schooling, etc.

There is no restriction as to the educational or training institution selected, provided it is an approved institution, nor as to the course of study or the training chosen provided it is offered by the institution selected. The applicant must satisfy the institution that he is qualified to begin the course of study or training and must make acceptable progress in the course.

The Veterans Administrations will pay veterans pursuing these educational or training courses $50 per month for living expenses ($75 if the veteran has dependents) and will pay for tuition and books not to exceed $500 per year.

Application for the education or training benefits must be made within two years from the date of discharge or relief from active service or within two years from the termination of the present war whichever is the later. And the education or training must be completed within seven years following the termination of the present war.

Applications for educational or training benefits should be made on Veterans Administration Rehabilitation Form 1950. The application may be made to:

1. The regional office of the Veterans Administration holding applicant's case file.

2. The regional office of the Veterans Administration in the state in which the educational or training institution, chosen by the applicant, is located.

3. The approved educational or training institution chosen by the applicant for his education or training.

II. Those separated from the military or naval service because of service-incurred disability are not required to have served a minimum of 90 days. Their eligibility to benefits under the "G.I. Bill of Rights" is somewhat complicated owing to rehabilitation programs and pension provisions. Such veterans should apply to the Veterans Administration for the provisions applying in their particular cases.

Reminiscences III

By NELSON S. MAYO
Highland Park, Illinois

IN THE early nineties, by no stretch of imagination, could the faculty at Kansas State be called a "sporting faculty." Not one of them would go across the street to see a baseball or football game. There was a faculty rule against allowing the students to play at games away from the college as a college team. One time, in faculty meeting, I was trying to get some relief for the students and I asked an old German professor if he had ever seen a football game and he replied, "Vell, it is not necessary to descend to the depth of infamy to know vat infamy is."

In those days the students at Kansas State College were required to attend chapel exercises every morning. The faculty was also expected to be present and sit in an awe inspiring row on the platform. If any member of the faculty had an addition to his family the students would remain sitting when dismissed and cheer until the particular parent made a speech. It was useless for the father to stay away as the students would "lay for him" when he did come. We were the happy parents of twins—a boy and a girl. The students cheered vociferously. I thanked them for their greeting and wished the same to them. They stopped cheering.

It was about in 1892 that I helped the boys get up their first football team and as "individuals" they went to St. Mary's College and won a game. The next year St. Mary's got Ernest Quigley as a coach (Quigley was for many years afterwards an umpire in the National baseball league), and St. Mary's won. At this college for boys the students ranged from small boys to young men; the little boys were on the side lines holding on to the Fathers' cassocks and every time St. Mary's made a gain they would jump up and down and yell, "Corn bread and gravy did that, didn't it Father?" They evidently had a training table.

While a student in the Chicago Veterinary College I became interested in actinomycosis and often went to the Union Stock Yards, on certain days, to see them shoot condemned cattle showing lesions of actinomycosis. I started some research work on this disease but didn't get very far but published a bulletin on the subject, in which I held that an animal should not be condemned for food because of a small localized actinomycotic lesion.

In the central west at this time "loco disease" was attracting considerable attention, particularly in the public press. The disease was not of much economic importance, but the peculiar nervous symptoms exhibited gave rise to many fanciful tales of the effects of loco weeds on man, as well as animals. I made an extensive study of loco disease and decided that it was due to "malnutrition." Nutritional diseases were practically unknown at that time. I think that this conclusion still stands.

One day I was called out in the country to a case of dystocia in a mare. An examination revealed a marked case of hydrocephalus. An

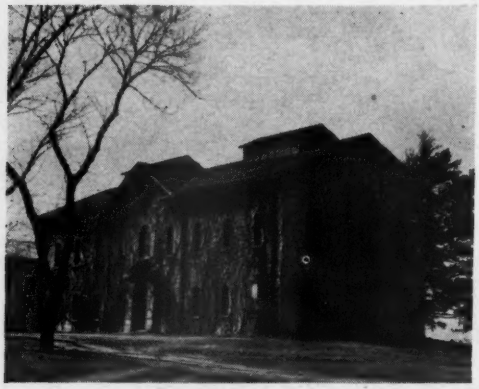
ANDERSON HALL

Throughout the years the Main College Building at College State. Chapel exercises, which students were required to attend, were held here until the new auditorium was built in 1904

Photos, courtesy R. R. Dykstra, Dean of School of Veterinary Medicine, Kansas State College.

incision was made in the supracranial envelopes to allow the fluid to escape and delivery was accomplished. The skin had collapsed in the bowl shaped cranial cavity and when the owner saw it he exclaimed, "See that locomotive smoke stack. That old mare always was afraid of the cars." This foal's head was mounted and is, or was, in the Veterinary Museum at Kansas State College.

In the early nineties I called a meeting of Kansas veterinarians at the college. I don't know whether this was the first organized meeting of veterinarians in Kansas or not. There were not many graduate veterinarians in the state at that time and I do not know whether this organization was continued or not. Among the graduate veterinarians that I recall were Orr and Brady at Manhattan, Welch at Salina, Knott at Clay Center, Cook



THE ARMORY
Headquarters of the departments of Military Science and Veterinary Medicine until 1908, when the Veterinary Building (left rear) was erected shortly after the professional veterinary course was inaugurated

at Hutchinson, Phillips Brothers at Wichita (one or both of these devised the equine stomach tube that was named the "Phillips Tube"), Richards of Emporia, Pritchard of Topeka and R. C. Moore of Holton. There may have been more that I do not recall.

When I went to Kansas in 1890, Dr. Wm. H. Going was State Veterinarian and also Post Veterinarian at Fort Riley. In 1892, the Populist political party came into power and Doctor Going was succeeded by Doctor Pritchard of Topeka. In 1894, the Republicans regained control and the legislature abolished the office of State Veterinarian and provided, that the veterinarian at Kansas State College should be veterinarian for the State Live Stock Sanitary Board. This added to my many and varied duties. It involved much hard travelling over the state, sometimes as much as 25,000 miles in a year, and gave me the opportunity to contact the more important livestock diseases in the field. The usual procedure at that time was for a disease to be reported to the sheriff of the county, who made a preliminary investigation and, if he thought it was important, he, in turn, reported it to the Live Stock Sanitary Board and they sent me to investigate. This arrangement seemed necessary as, due to a lack of veterinarians in the state, all sorts of excuses were made to secure veterinary services for a fistula, or case of heaves. Many times while riding with old time "border" sheriffs I have listened to stories of outlaws that were dime novel thrillers.

It was on a trip for the State that I had my *first* experience of being threatened with a gun. I went to a small village where a farmer met me to take me to a farm to see some ailing cattle. On the way the man inquired if I was armed. I told him no, although I always carried a "44" in my grip to shoot glandered horses or other hopeless cases. My driver said the farmer might not let us on his place. I told him if the farmer objected he had better stay in the road. I found that there was a glorious neighborhood row and my driver had reported his neighbor's cattle because they had "pink eye" a rather common disease at times. When we reached the farm the owner met us with a double-barrelled shot gun and ordered us off the place. I sent my driver back to the road, while I told the farmer I came out to try and help him, that I knew what was the trouble with his cattle, and might suggest some helpful treatment. The farmer said, "You talk fair, send that So and So away." I told him I must have means of getting back to the railroad. The farmer said, "I'll take care of that" and he called to his wife to get us a good dinner. So this threatened war ended.

In condemning animals in State work, one had to "watch out" for some ulterior motive, particularly if the ostensible owner *wanted* the animal condemned. In connection with the State work I was witness in court in a number of cases involving animal diseases. The most important being losses from Texas fever. In one case a trainload of Texas range cattle were shipped to Kansas for summer pasturing. The owners made an affidavit that the cattle had not been south of the U. S. quarantine line and the Kansas Livestock Board issued a permit admitting them. The cattle were driven some 35 miles across country to the pastures. It was in the spring, the cattle were thin and a number of stragglers were left along the way. In a few weeks native cattle were dying by the score from Texas

fever. The Texas cattlemen were not financially responsible so the Kansas cattlemen brought suit against the railroad that brought the southern cattle in. The suit was carried to the Federal courts and the railroad paid the damages.

In another case, a Kansas cattleman lost 80 head of fat steers that were ready for the market. When I expressed sympathy he said, "It's one of the incidents of the business."

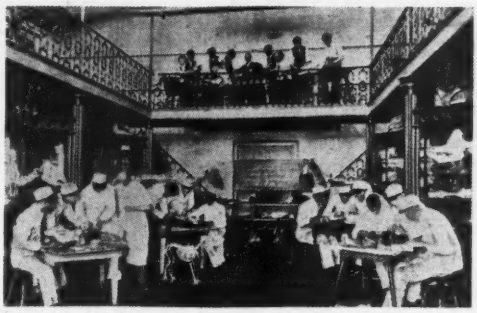
The primitive ideas of the time concerning tuberculosis in cattle are illustrated by what was long known as the "tuberculosis episode." It also illustrates ways of manufacturing political capital. Shortly after going to Kansas I suggested to the professor of animal husbandry that he have the college herd tuberculin tested. He agreed to the suggestion and asked permission of the Board of Regents to have the test made. The Board authorized the test of five suspected animals and provided that two might be slaughtered "if strong indications of the disease" were found. One of the five reacted and the presence of the disease was confirmed on post-mortem examination. This was in 1894 and was probably the fifth use of the tuberculin test in this country, Professor Henry of the University of Wisconsin, Dr. Leonard Pearson, State Veterinarian of Pennsylvania and two New York practitioners having employed it a few months earlier.

However, boards act slowly and it was not till September, 1896 that the Board of Regents, on the joint request of the head of the Animal Husbandry Department and myself, authorized the test of the whole college herd. Eighteen of the 52 animals reacted. At the next meeting of the Board (January, 1897) it ordered that the affected animals should be segregated.

No further action was taken until September, 1897. By this time a new Board was in charge and about 50 per cent of the old faculty including both the professor of animal husbandry and myself were gone. The Board, without any reference to what had preceded, but with loud fanfare ordered a test of the herd and employed Professor James Law of New York, Dr. T. A. Geddes of the Bureau of Animal Industry and Dr. Paul Fischer, professor of veterinary science at the College, to make the test.

It was ordered that any diseased animals that were found be burned, the barns and lots be purged of the disease, college milk be not used for any purpose, students and other persons be prohibited from sleeping in or near the barn, persons living in the drainage area below the barn be notified of the possible danger and no purchases of cattle, hogs or sheep be made until tuberculosis was eradicated from the college farm.

The same animals, that had reacted 10 months previously, reacted again and the carcasses were burned in the presence of more than 200 newspaper men, physicians, veterinarians, state officials and others. Three hundred pounds of sulfur were burned in the cattle barn "to disinfect the building of germs, insects and mice." It is hard to imagine the amount of acrimonious, partisan discussion in which the press of the state indulged. On the



Veterinary dissecting room in the Armory. Rifles were stacked on the first floor; the veterinary department occupied the second floor

one hand the old management was charged with criminal neglect in allowing the disease to develop; on the other the new management was charged with having created a spectacular situation for personal and political purposes. Newspapers all over the state published long editorials on the "tuberculosis episode" and speech makers made of it sort of Roman Holiday. However at the college the subject was soon dropped.

At times there were quite serious losses of cattle from rabies; on one ranch 40 head of cattle, some hogs, two dogs, and a pet raccoon died from rabies. A strange dog had fought with the two dogs the rancher's boys used for herding their cattle and these dogs bit their cattle and other animals. In another outbreak of rabies, the cattle were in the timber along the Saline River. While looking for a case, a rabid steer spotted me and came charging and bellowing with his mouth open. I was able to dodge around a clump of box elders. A nephew of the ranchman who had just arrived from the East on his wedding trip was sitting in a surry nearby and he kept shouting, "Don't let him catch you." I suggested that he come down and tole the steer away but he shouted, "Not on your life—I'm just married."

(To be continued)

War Time Feeding of Livestock*

By J. B. FRANCIONI, JR.†
Baton Rouge, Louisiana

EVERY livestock raiser should establish a "draft board" and apply to his herds and flocks sound principles of "selective service" which will produce maximum efficiency. A good "selective service" program must give first consideration to the development of the most profitable kind and type of livestock for their environmental conditions which can be accomplished only by: (1) careful selection, (2) intelligent breeding practices, (3) approved feeding operations, (4) intelligent care and management procedure, (5) the control and prevention of diseases and parasites and (6) effective marketing.

America's wartime food program must be supported by making every pound of feed do the best possible job of producing meat, milk, wool, eggs and work. This must be done in spite of the fact that labor is scarce, difficult to find, that the cost of feed, both concentrates and roughage, has advanced more rapidly than has the price of livestock. Grain and protein concentrates are becoming difficult to secure at any price and, in spite of all uncertainties, the livestock program cannot afford to lag. Production of livestock and feed crop production must be brought into balance.

To meet the present emergency there must be an increased use of home-grown grains, pastures and roughages with a necessary adjustment in the supplemental feeds available.

Pastures in the Livestock Picture

Pasture is the cheapest feed for all classes of livestock and forage stands next to pasture as a low-cost feed. With the exception of poultry, the feed shortage can, to a large extent, be met by the improvement of pastures and by growing more and better quality of hay and other forage. Pastures furnish a cheap supply of vitamins, minerals, provide a high quality protein, add variety to customary rations, provide a means of exercise and tend to act as a general tonic. In addition, well planned pastures can be used to reduce concentrate requirement by one-half to two-thirds in the case of dairy cattle and even more with beef cattle. Pasture, hay and other forage crops supply under normal conditions, 60% or more of all feed required by all livestock: beef cattle may get 80%; dairy cows, 76%; horses and mules, 67%; sheep, 95%; hogs and poultry, 5% of their nutritional requirements from pasture and forage. Under wartime conditions, their use can and should be stepped up to the limit. The carrying capacity of an acre will depend on the fertility of the land and its management. The writer likes to speak of pastures in the amount of pounds of livestock produced, instead of the number of animals carried per acre.

Pastures for Beef Cattle.—By extensive use of pastures plus cured hay, supplemented with a small amount of protein concentrate such as cottonseed cake or meal, satisfactory beef can be produced with minimum labor and cost. Beef cattle require from one and one-half to 10 acres per cow and calf.

Pastures for Dairy Cattle.—Dairy cattle make intensive use of pastures in the form of permanent, temporary, and supplementary grazing crops and, if the production is more than a pound of butter per day per cow, must receive grain in addition. Dairy cows require from one and one-half to two acres usually of a better grade than that used for beef cattle.

Pastures for Work Stock.—Turning work stock regularly on pasture at night is a commendable practice, though not often practiced. By use of good pasture, a saving is effected in the quantity of hay needed by the animals. Pasture is exceedingly important for colts and brood mares. Work stock requires one to two acres per animal.

Pastures for Swine.—Although pastures have an important place in the production of hogs, they cannot be used extensively. Hogs can live and even make some gain on grass alone. Nevertheless, for best results, growing pigs and fattening hogs must be fed a well-balanced grain ration even where good pasture is available. Ordinarily, an acre will furnish pasture for from five to 15 hogs averaging 100 pounds in weight.

Pastures for Sheep and Goats.—They head all livestock in their ability to maintain themselves, to fatten and to produce carcasses of good quality on pasture alone. Generally, from 80 to 100 ewes can be supported on 40 acres.

Pastures for Poultry.—Furnishing green succulent feed in poultry raising is a most important problem and should be used to the fullest advantage the year round. One acre of good pasture should be provided for 100 to 200 birds.

Feed Value of Immature Pasturage.—Immature pasturage, including the grasses and

*Presented at the 13th Annual Conference for the Louisiana Veterinary Association conducted by Louisiana State University and A. & M. College.

†Professor and Head of Animal Industry Department, Louisiana State University.

the legumes, has feeding properties similar to those of high-protein concentrates such as oil mill by-products. They are especially well supplied with protein, minerals and vitamins. Fresh pasture may be looked upon as "watered," 16% protein feed.

Since immature pasturage is rich in protein, vitamins and minerals, and is more digestible than most of the best mature hay, there is much interest in methods of preserving it for winter use. Immature pasturage may be preserved by drying with artificial heat or preserved by making it into silage. A good product may be obtained by adding to the grass one part of molasses diluted in two parts of water at the rate of 40 pounds of molasses per ton of green grass.

Forage

Hay.—Of all the crops produced and harvested on the farm, hay should be the most abundant and adequate. This is true despite the fact that in this section we do not have the best haying weather. With the exception of hogs and poultry, hay plays an important role in livestock production. Regardless of how good the grazing, it alone will not produce as good results as when supplemented with good quality hay. For example, grazing alone will not maintain beef cattle through the winter months with the same degree of thrift as will good quality hay. Both grazing and silage are satisfactory winter feeds for beef cattle, but it is more profitable to use them to supplement good quality hay with cottonseed cake or meal as needed. This is easily understood when one considers that 100 pounds of corn silage contains only 17.7 pounds of total digestible nutrients and that green oats contains 15.9 pounds; Bermuda hay 43.4 pounds; alfalfa hay, 50.6 pounds and lespedeza hay, 52.2 pounds. Hays are divided into two sub-classes, the legume hays and grass hays. This must be given important consideration in all livetock feeding.

We must bear in mind that early cut hay is much richer in protein and higher in total digestible nutrients than when cut at a late stage of maturity. This is especially true of hay from grasses. Unfortunately, the deciding factor in the growing of hays is not always which hay is the most nutritious, but which hay will produce the most tons per acre. All hays must be considered as important roughages since they give the bulk so necessary to the ration as an aid to digestion, especially in all ruminants. All rations should, of course, be made up of both roughages and concentrates for best results.

In Louisiana and elsewhere, where shocking hay in the field is a common practice, much food value is lost due to time of cutting, improper shocking and poor methods of feeding. Too often such a poor grade of hay is produced that it is no better than good straw from a feed standpoint.

Straw.—Straw is satisfactory as a considerable part of the roughage fed to our livestock especially in winter time—not that it has a great deal of food value, but because of the heat it liberates in the mastication and digestion. This is especially true for horses and mules at light work or idle, or for wintering beef breeding cows. It should not form any large part of the roughage for dairy cows, for growing or fattening cattle or sheep, or for horses or mules at hard work. Straw is a hay saver, when rightly employed.

Silage.—At low expense silage furnishes high-quality, succulent feed for any desired season of the year. Crops may be made into silage when weather does not permit of hay making or preserving the corn crop or other such crop satisfactorily as grain or straw. Silage has a definite place in peace or wartime feeding.

Silage can be made at any time in season and can be put into any type of silo. When an upright silo is not practical or too costly, very satisfactory silage can be made in a trench silo providing the drainage is good. An overground silo has proved good in level or wet country. A trench silo is just what the name implies and an over-ground silo consists of two earth ridges above the ground into which silage is piled.

Customary Amounts to Feed Farm Animals

There is an old saying, "The eye of the master fattens his cattle." Though present-day procedures are based on scientific knowledge, the "eye of the master" is still highly important for success. The following general rules will serve to give a general idea of the nature and amount of the rations given to farm animals. It should be borne in mind that these rules should serve only as very general guides, to be modified to suit individual animals and different conditions with respect to the supply and relative costs of feeds.

Horses and Mules.—1. In general feed two pounds of feed or a little more daily per 100 pounds of live weight.

2. For horses doing no work, feed hay at will and as much concentrates as necessary to keep them in good condition. If a very palatable hay, such as alfalfa, is used; it will be necessary to use some straw in the ration.

3. For horses doing light work, feed one pound of concentrates and one pound of roughage daily per 100 pounds of live weight.

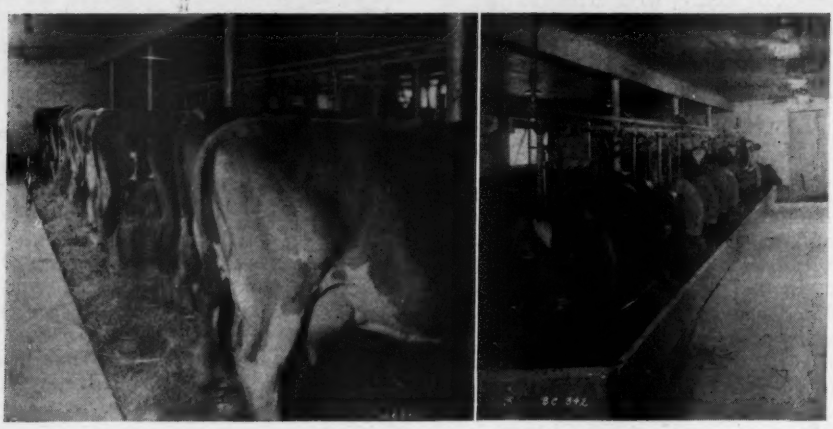
4. For horses doing average farm work, feed 1.25 pounds of concentrates and one to 1.25

pounds of hay daily per 100 pounds of live weight.

5. For horses doing hard farm work, feed 1½ pounds of concentrates and one to 1.25 pounds of hay daily per 100 pounds of live weight.

6. An average allowance to keep horses and mules in good condition throughout the year should be about 2,000 pounds of grain, 4,500 pounds of dry roughage, and good pasture, per animal.

Dairy Cattle.—1. For growing heifers, feed ⅓ to ½ pound of concentrates (the same mixture as used for milk cows is excellent) daily per 100 pounds of live weight and roughage free choice.



The amount of concentrates needed for dairy cows varies according to whether milk produced is high or low test

2. For dry cows, feed 20 pounds of corn silage or seven pounds of grass hay a head and other roughage free choice, or four pounds of concentrates and roughage at will, or run on good pasture.

3. For milk cows, feed about two pounds of legume hay or one pound of legume hay and three pounds of corn silage daily per 100 pounds of live weight, together with the amount of concentrates prescribed in paragraphs 4, 5 or 6.

4. For milk cows producing high test milk, feed one pound of concentrates daily for every 2.5 to three pounds of milk produced daily, together with roughage as in paragraph 3.

5. For milk cows producing low test milk, feed one pound of concentrates daily for every four pounds of milk produced daily, together with roughage as prescribed in paragraph 3.

6. Feed one pound of concentrates daily, for every pound of butterfat produced in a week, together with roughage as in paragraph 3.

7. Use a variety of feeds to insure the proper quality of protein.

Beef Cattle.—1. In general, feed about 2.5 to 3.25 pounds of dry feed daily per 100 pounds of live weight.

2. Calves require 1.5 to two pounds of concentrates while yearlings and two-year olds require one to 1.5 pounds per 100 pounds of live weight.

3. For maintenance, feed roughage at will.

4. For wintering stockers, feed roughage at will.

5. In getting fattening cattle on full feed, start them with two pounds of concentrates per head daily and roughage at will. Increase the concentrates one pound daily until they receive 10 pounds of concentrates per head, then increase the concentrates one pound every three days until they are on full feed.

6. For fattening cattle on full feed, feed 1.75 to two pounds of concentrates and 0.75 pound of roughage daily per 100 pounds of live weight. In this connection it should be noted that many cattle feeders, especially outside the corn belt, use much less concentrates and more roughage than prescribed by this rule. Haecker of the Minnesota station recommends not more than one pound of grain per 100 pounds live weight.

7. Calves will require for 180 days (usual feeding period) of feeding about 2,000 pounds of grain and 1,000 pounds of roughage. They should gain about 400 pounds.

8. Yearlings will require for 150 days (usual feeding period) of feeding about 2,000 pounds of grain and 1,500 pounds of roughage. The gain should be about 350 pounds.

9. Two-year-old steers will require for 120 days (usual feeding period) about 1,900 pounds of grain and 1,600 pounds of roughage. The gain should be about 350 pounds.

Generally speaking age has little effect on the total amount of concentrates required to finish an animal, but older animals will consume more roughage per hundred pounds gain. During the feeding period calves should double their weight or gain 350 to 450 pounds; yearlings should gain about 60% of their initial weight or from 300 to 400 pounds; and two-year-olds should gain about 45% of their initial weight or about 275 to 350 pounds.

Swine.—1. Pigs of any class, that are in full production, can be self-fed.

2. In general, full-fed, fattening pigs will consume three to five pounds of concentrates per 100 pounds of live weight according to age, the younger pigs consuming proportionately the larger ration.

3. Good forage reduces the need for protein supplement but does not reduce the total daily feed consumption.

4. Feed pigs that are being developed for breeding purposes should have three to four pounds of concentrates daily per 100 pounds of live weight, and good pasture.

5. For fattening pigs at weaning time (weigh-

ing about 50 pounds), feed five pounds of concentrates per 100 pounds of live weight daily and forage at will.

6. For fattening shoats (weighing about 100 pounds), feed four to five pounds of concentrates daily and pasture at will.

7. For fattening hogs (weighing about 200 pounds), feed three pounds of concentrates daily per 100 pounds of live weight.

8. For wintering pregnant sows, feed one to

1.5 pounds of concentrates daily per 100 pounds of live weight with legume hay at will.

9. For pregnant sows on good legume pasture, feed up to one pound of concentrates daily per 100 pounds of live weight. That is the maximum. During the first half of the gestation period mature sows may do well without any concentrates.

10. For sows nursing litters, feed three to five pounds of concentrates daily per 100 pounds of live weight, depending upon size of litter and availability of pasture.

In summarizing we may say a pig weighing 50 to 100 pounds should eat from three to five pounds of dry feed daily and should gain about one pound per day.

A pig weighing from 100 to 200 pounds should eat about four to six pounds daily and gain about 1.5 pounds daily.

A pig weighing from 200 to 250 pounds can eat six to eight pounds daily and should gain from 1.5 to 1.75 pounds daily.

Sheep.—1. For young lambs (weighing 30 to 50 pounds), feed 0.25 to 0.5 pound of concentrates daily with roughage at will.

2. For fattening lambs (weighing 50 to 90 pounds) on full feed, feed one to 1.5 pounds of concentrates and 1.75 pounds of legume hay daily per 100 pounds of live weight.

3. For pregnant ewes, feed roughage at will until within a few weeks of lambing, then feed 0.5 to one pound of concentrates daily.

4. For ewes suckling lambs in a dry lot, feed one pound of concentrates daily and roughage free choice.

Efficiency of Animals

The different kinds of animals vary markedly in their efficiency to convert feed into food. For example:

1. To produce 100 pounds of gain in weight, two-year-old steers will require approximately 700 to 800 pounds of concentrates and 400 to 475 pounds of legume hay.

2. Lambs require 400 pounds of grain and 500 pounds of hay for 100 pounds gain.

3. Hogs require 450 pounds of concentrates and no roughage for 100 pounds gain.

It can be seen that the species of animal has a marked effect upon the cost of production and the "margin" necessary to produce a profit.

Conservation

The order of the day is to produce the greatest amount of livestock product in the shortest possible time on the least amount of feed. We have been urged to not only use feed efficiently but to especially make the best possible utilization of the protein feeds available for the various classes of livestock including poultry. This is a war measure and supported by the U S D A.

The livestock producer should be guided in the compounding of rations and in the choice of feed materials by the principle of providing a practical system of feeding as efficiently and economically as possible. He should also use, so far as practical, feeds grown in his community to minimize the burden on our transportation system.

Beef Cattle

Special considerations should be given the following:

1. Maintenance on average native pasturage or other low-grade roughages: Dry cows, one pound protein supplement per head daily; pregnant cows, 1.5 pounds (increase to two pounds 60 days before calving); cows with calves at side, 2.5 pounds; calves and yearlings, one pound.

2. Aged steers wintered on range and destined for fattening on grass, two pounds protein supplement daily; grain as needed.

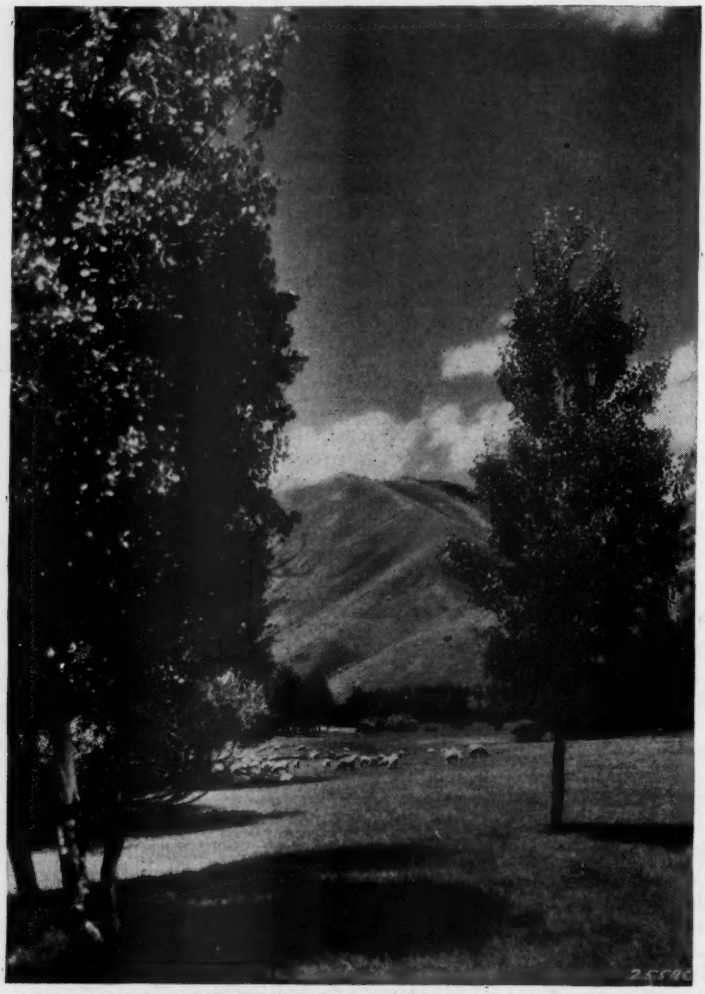
3. Steers or heifers being fattened in dry lot or on pasturage for slaughter at close of a normal fattening period, two to 2.5 pounds protein supplement per head, daily. If legume hay is the only roughage, the amount of protein supplement may be reduced by one-half.

4. Cattle being grazed on Sudan or other green temporary summer pastures or cattle grazed on winter small grain pastures need not be fed protein supplements. Cattle being maintained over winter need not be fed protein supplements after spring grass and weeds appear in sufficient volume to afford fair fills. Grain may be used in subsequent feedings. Given a supply of high-quality carbonaceous hays or bundle feeds of good alfalfa or other legume hay, all cattle may be expected to winter in fair condition without protein supplements. On abundant green winter grazing such as oats, barley, rye, good native grasses, or other green feed, protein supplements need not be fed—grains can be fed instead.

5. Vitamin A deficiency may be expected in beef cattle, only under rather extreme conditions of drouth or in fattening in dry lot when

roughages are used that do not have green color. In case of vitamin A deficiency, which is shown by night blindness, properly cured alfalfa hay will correct the deficiency.

6. With scant allowance of protein supplements, it is suggested that mineral supplements high in phosphorus be supplied during winters or drouth. Equal parts of feeding bone meal or defluorinated phosphates and salt mixed and supplied free-choice make a desirable supplement for most sections of this state. In some sections bone meal alone is required and in other sections a mixture of two parts bone meal and one part salt is necessary. In dry lot fattening with carbonaceous roughages, 0.1 pound of pulverized limestone or oyster shell daily per head should be mixed with the feed.



Flocks may be wintered without protein supplements if legume roughages and cereal grains are available

Sheep

The principles of feeding cattle apply also to sheep, but smaller amounts of feed are involved.

1. Maintenance on average dry native pasturage or other low grade roughages: Dry ewes and wethers, 0.25 pound protein supplement daily per head; bred, 0.4 pound (30 to 50 days before lambing); ewes with lambs, 0.5 pound. Protein supplements need not be fed after green feed appears.

2. When legume roughages and cereal grains are available, farm flocks may be successfully wintered without the use of protein-rich supplements.

3. In creep feeding lambs for early market and with lambs following ewes on green pasturage, protein supplements need not be included in the ration.

4. Lambs or yearlings being fattened in dry lot with carbonaceous roughages: One-third pound protein supplement daily per head. If legume hays are full fed, the protein supplement may be decreased to one-half the amount fed with carbonaceous roughages.

Dairy Cattle

Plenty of good roughage will reduce the grain requirements and increase economy of production. Cows need two pounds of dry roughage or its equivalent in pasture or silage per hundred pounds of live weight. Every 1% increase in the protein content of the roughage will reduce the required protein content of the grain mixture approximately 2%.

Pastures.—An abundant supply of good pasturage is the most effective means of reducing the protein required in the grain mixture. From one-half to two-thirds of the protein require-

ment of dairy cows can be furnished through supplying the herd with ample pasture. Provide one acre per cow of temporary pasture such as Sudan grass for late spring, summer, and early fall; and oats, wheat or barley for fall, winter, and early spring. Keep all pastures grazed or mowed to maintain maximum rate of growth and protein content.

Hay.—Good hay can provide much of the protein requirement of the dairy herd, especially during the off-pasture seasons. Produce legume crops for hay where they are adapted because they are high in protein. Legumes should be cut in the early bloom stage for hay production. Sudan or Johnson grass, etc., should be cut for hay just as it starts to head for maximum yield and high protein content.

Silage.—To secure the highest protein content and at the same time have a good quality silage, corn and non-sweet sorghums should be cut for silage in the stiff dough stage—sweet sorghums in the hard dough stage.

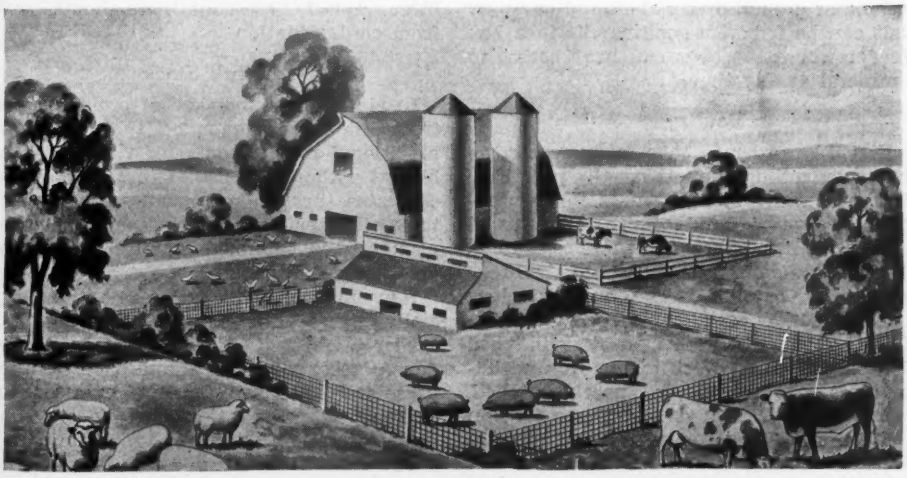
Vitamins and Minerals.—Dairy cattle need adequate amounts of certain vitamins and minerals for the most efficient use of all the other feed nutrients they consume. Vitamin A is the vitamin most likely to be deficient in the ordinary ration and can be best supplied through providing adequate green pasturage. Salt, calcium, and phosphorus are the mineral elements which usually should be added to the dairy ration. Salt can be supplied through the addition of 1% to the grain mixture and furnishing block salt as a lick. Adequate calcium may be supplied through the addition of 2% of ground limestone or ground oyster shell. Phosphorus is usually supplied in adequate amounts when cottonseed meal and wheat bran are used in the grain mixture. If these feeds are not used, it is best to use 2% of bone meal in the grain mixture and leave out the calcium supplement.

Swine

Louisiana pork producers can feed their farm grains to hogs profitably when suitable protein concentrates are provided in the proper proportions. Corn, grain sorghums, and other farm grains are low in the quantity and the quality of protein needed in the swine ration. Certain vitamins and minerals are also lacking in farm grains.

Hog producers can reduce the protein feed requirements, for most classes of hogs, from 30 to 50% provided the pastures are of high quality, and provided the yield per acre is high. Alfalfa and the clovers rank at the top as pastures for hogs, but rape, Sudan grass, oats and other small grains, soy beans, peanuts, cowpeas and such crops will provide protein, mineral matter and vitamins. Pastures also help keep pigs thrifty by providing clean ground, also while grazing in the sunshine the pigs are supplied with vitamin D.

Proper management can also help to save protein supplement feeds. For example, feeds should not be allowed to become stale, sour, and unpalatable by feeding in poorly constructed self-feeders, or by keeping more feed in the self-feeder than can be eaten by the hogs in two or three days. Self-feeders should be placed under sheds where rain or dust cannot contaminate the feed. Rats, birds and other pests should be controlled by the use of self-feeders with lids or otherwise, so they cannot eat the feed supplied the hogs. Where the hogs are fed a limited ration of grain, and the pasture is green and plentiful, less protein



feed is required to balance the grain fed.

In addition to saving feed, good winter pastures (wheat, barley, oats, rape and clovers) provide valuable vitamins and minerals, reduce costs and increase profits.

To fatten hogs on pasture, a good protein supplement mixture, if animal protein is unavailable, is: 100 pounds of cottonseed meal; 100 pounds of peanut meal or soy bean meal; 10 pounds of ground limestone; and two pounds of salt. If tankage is available, use a mixture of: 35 pounds of cottonseed meal, 30 pounds of peanut or soybean meal; 15 pounds of tankage, fish meal or meat scraps; and 20 pounds of wheat gray shorts, flour middlings or ground wheat. For fattening pigs over 125 pounds, a well-balanced combination is: Seven pounds of the protein supplement mixture with 93 pounds of corn meal; six pounds with 94 pounds of sorghum grain chops; five pounds with 95 pounds of ground barley; or four pounds of protein supplement with 96 pounds of ground wheat.

Hogs in the dry lot must have legume hay in racks; and need mixtures of 13 pounds of protein supplement and 87 pounds of corn meal; eight pounds with 92 pounds of sorghum grain chops; six pounds with 94 pounds of ground barley; or four pounds of protein supplement and 96 pounds of ground wheat.

Self-feeders save time and labor. Use a complete mixture or grain and protein supplement in separate compartments. Only protein supplement and mineral are needed with ear corn or crops "hogged off."

Where skim milk is available, one gallon per pig per day will furnish all the protein supplement needed to balance the grain.

A mineral mixture composed of two parts by weight of bone meal, two parts ground limestone or ground oyster shell and one part of salt can be fed with good results in a box or feeder where the hogs can have access to the mineral at any time.

Poultry

Culling.—In order to save feed, we recommend more culling than is usually practiced. This should start with the eggs for incubation. Only eggs of standard size (chickens 24 ounces per dozen; turkeys 32 ounces per dozen) and free from abnormal shapes and shell texture should be used. The unsatisfactory chicken or turkey eggs should be marketed.

Cull the young birds when first hatched and during the first week to remove and destroy birds that are crippled, poorly hatched, or otherwise defective; do not waste feed on them. Remove chicks or poults that are not doing well during the growing season. Eat them if they are healthy and destroy them if they are diseased. Feed only thrifty birds that will make satisfactory use of the feed. Keep culling all through the growing season.

Discard any small, weak pullets as they reach maturity and heavy, coarse, masculine pullets; neither of these types make profitable producers. Watch the hens carefully all through the laying year and take out any that develop grey eyes, the only exception being Dark Cornish. Take out all sick hens as soon as observed; destroy all that are seriously sick. Isolate and treat for worms and lice any hens which are only slightly sick or out of condition. Destroy all that do not show improvement within a few days. Sell any hens in February or March that are not laying or do not appear to be coming into production. Improve quality and add weight before marketing them by pen feeding.

Use Home Produced Protein to the Maximum.—The amount of concentrated protein feeds for poultry may be reduced somewhat by the use of succulent green feed. Pasture from oats, wheat or barley in winter and Bermuda and Sudan grass in summer supplies protein, vitamin A and riboflavin. All of these are needed by poultry. The value of these pastures is much greater if the plants are kept short either by pasturing reasonably heavy with poultry and other livestock or by mowing. Lawn clippings and pea green alfalfa hay are excellent for poultry.

Liquid skim milk, which cannot be used for human consumption, can replace up to 75% of the cencentrated protein feeds if it is regularly available and enough can be supplied to furnish all of the liquids the birds require; in other words, it must replace water. The milk dishes should be kept clean, also the litter around these containers should be free from contamination.

Work Stock

In view of the shortage of protein concentrates, it is recommended that satisfactory nutritional requirements for work stock may be met without the use of these protein concentrates through more general use of pastures whether temporary or permanent, supplemented by the roughages and grains grown on the farm or ranch.

Hays may be made more nutritious, especially with regard to protein content, if cut earlier in maturity than has been commonly done. Carbonaceous hays and oats are a good horse and mule feed. Corn or grain sorghums make a good grain ration for work stock where legume hays or abundant green forages are available.

A New Method of Cropping Dog's Ears

By LEON F. WHITNEY
Orange, Connecticut

EAR cropping in dogs is an unnecessary operation. Performed by kennelmen without anesthesia and in complete disregard of the niceties of surgical technic, it is a painful and cruel operation. The A.V.M.A., which is the official voice of the veterinary profession, disapproves of the operation. Many veterinarians refuse to perform the operation even for their best clients. Others, perhaps equally opposed to it, will crop ears when it is a case of them or some untrained operator doing it. The writer belongs to the latter group; holding the view that if the ears are going to be cropped in any case, it is better for the dog that the operation be performed without pain and in a manner that it may heal with the least possible discomfort to the animal.

The author has repeatedly written in popular dog magazines that he holds no brief for the practice of ear cropping; it is far better to breed dogs with ears of the proper size that will stand up without cropping, as has already resulted from the English laws forbidding cropping. Bull terriers no longer need to have their ears cropped and even Great Danes are being bred with erect ears. This can be done with every breed and soon the public would become reconciled, if not even come to like the natural ear the better. So long as ear cropping persists, sloppy breeding also will persist.

The State of Connecticut, recognizing that dogs' ears were being cropped anyway, despite regulations of the American Kennel Club and the laws of many States, passed a law putting the cropping of dogs into the hands of veterinarians. But there is still much bootleg cropping going on. This is said to be due to the reluctance of veterinarians to undertake the operation. And there is always the fear on the part of anyone who crops ears that the job may not be perfect. The non-veterinarian, bootleg ear croppers do not produce perfect results by any means. By the method here described it is possible to accomplish better results than can be achieved by any ear cropper who uses the bloody, customary method.

One of the most objectionable features of cropping dogs ears is the hemorrhage that results. The author has attempted to discover a neater method which would control the hemorrhage and remove some of the guesswork from ear cropping. That method is as follows:

The ears should be prepared for cropping as for any operation except that shaving the operative area is not required; since there is no open wound except for the incised skin edges, clipping and cleansing first with alcohol then with ether and followed by any of the non-irritating skin disinfectants is sufficient.

Sodium pentothal is the anesthetic of choice because of its prolonged action. By the time the puppy is completely out, he no longer feels the pain that results from the operation and is ready to carry on with his usual routine of eating, sleeping and growing, but no playing with other puppies until the ears are healed.

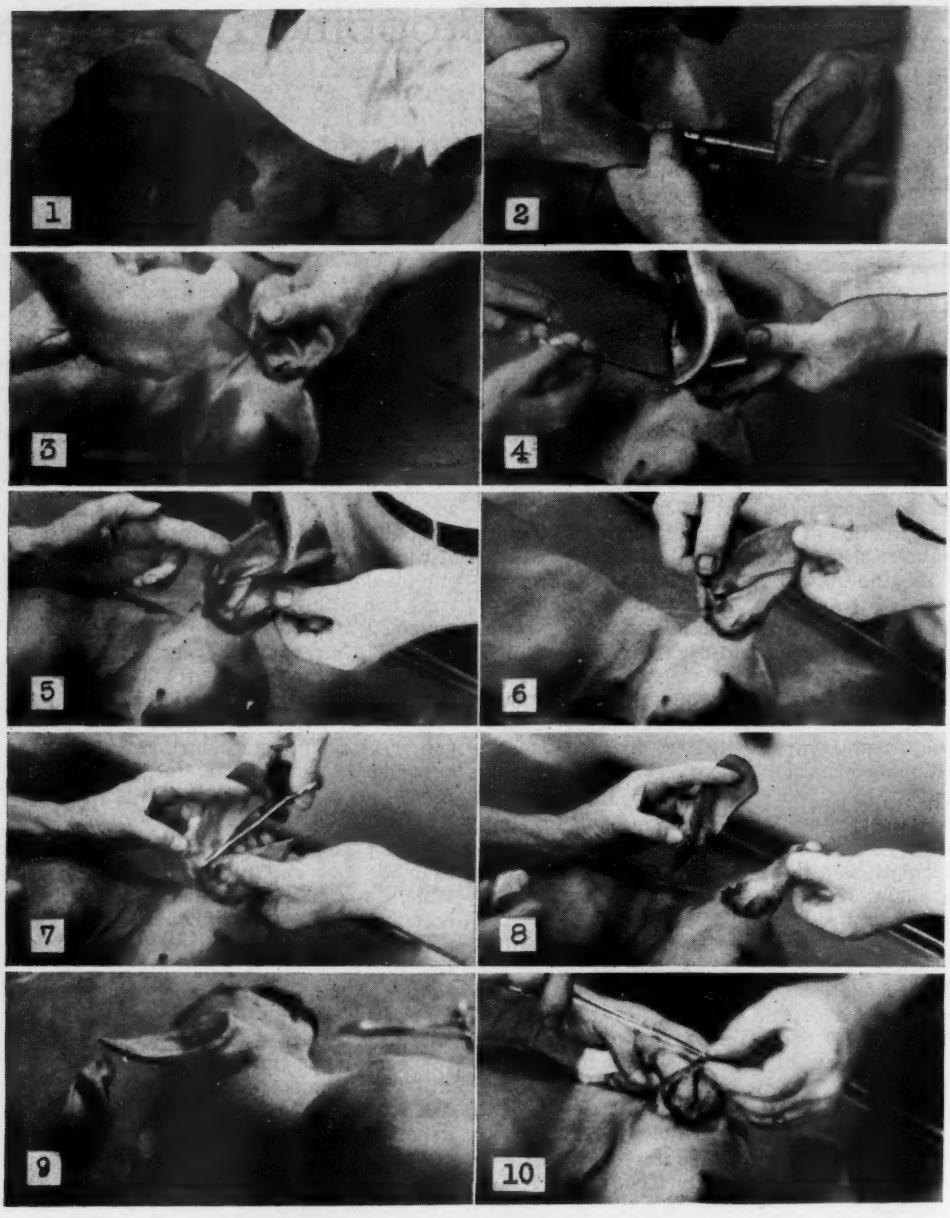
The method is certain, harmless and neat, as is attested by the hundreds of puppies which have been cropped by it. The departure from the old methods is primarily in the use of the emasculatome. This must be one of the old fashioned type with straight edges. The large size with 3-inch blades is used on larger puppies while one of the intermediate sizes is preferable on younger pups. The large one sometimes bites through the skin on puppies under 10 weeks old. The desired result is to cut the cartilage and compress the skin together in a one-eighth inch line. The scissor cut is made along the lateral side of the line. If the cut is made on the medial side there is likely to be bleeding.

In cropping larger ears it is often necessary to make two applications of the emasculatome, as sometimes a dog is presented for cropping with ears five inches long or longer.

It is not the object of this paper to discuss the *art* of ear cropping, whether to make short or long, broad or narrow crops and so forth. The owner will often express a preference. Some want wide ears; some want narrow ears; some want curved cuts made. Some will have wide cuts made and later return and ask that they be narrowed. In this case it is generally a simple matter as once the ears have come up, they will stay just as well when narrowed.

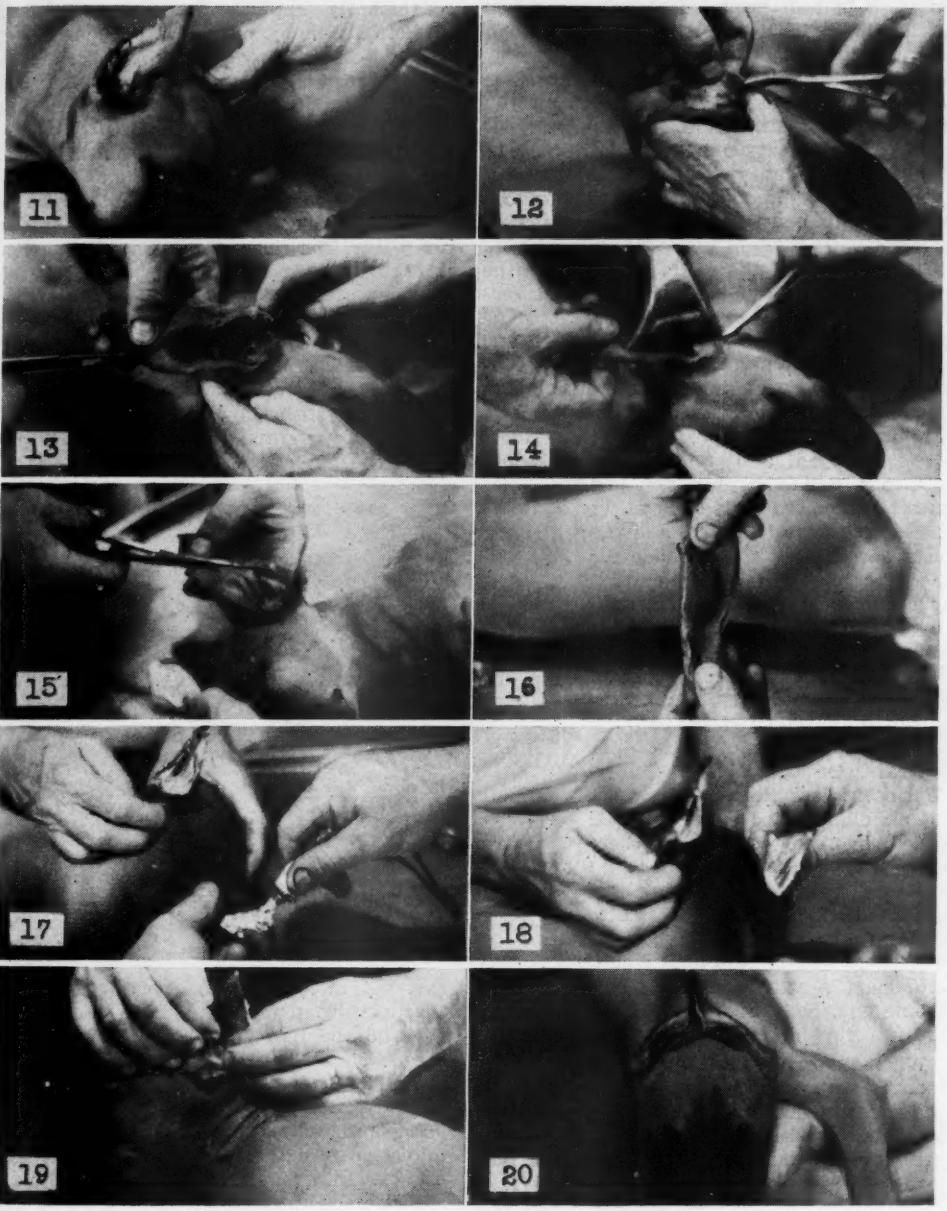
The accompanying illustrations show the process in a puppy that was four months of age. It is probably preferable to perform the operation at a younger age, but sometimes the operation is requested for much older puppies which are presented by owners who are willing to take the risk that the ears may not stand erect.

Since few breeders want their dogs to have ears that cause the head to appear very



MODUS OPERANDI FOR BLOODLESS EAR CROPPING I

1. Boxer puppy ready for cropping.
2. Administering sodium pentothal for anesthesia.
3. Guide forceps applied to the ear of a completely anesthetized puppy.
4. Straight edged emasculatome is applied to the ear, closed and clamped shut.
5. A second application of emasculatome is made if the ear is longer than the width of the emasculatome, as in this case.
6. A clearly defined line is left when emasculatome is removed. The line is straight but appears wavy due to angle at which ear is held for photographing.
7. The cut is made, bloodlessly, at the lateral side of line.
8. The piece of the ear that is severed.
9. The ear appears perfect, but requires stitching, as the layers of skin would separate later.
10. Gut sutures are inserted at ¼-inch intervals.



MODUS OPERANDI FOR BLOODLESS EAR CROPPING II

11. The ear is finished.
12. The piece removed from the first ear is laid on second and nick is made for a guide.
13. The guide forceps are applied to the left ear.
14. The emasculatome applied.
15. The piece removed.
16. The pieces from both ears are compared and found to be of same dimensions.
17. Liquid adhesive is daubed on both ear tips.
18. The adhesive is allowed to set for a few minutes.
19. The ears are brought together over head and compressed together tightly until the adhesive has set firmly.
20. The puppy is placed in a cage to regain consciousness. The ears are not molested further until they separate naturally. The puppy should not be permitted to play with other dogs during this period, nor should children play with it.

broad, a pair of curved forceps are applied as close to the head as possible, leaving enough room for the width of the jaw of the emasculatome. These are held by an assistant, since the operator needs both hands to place the instrument correctly. If a curved ear is desired it is necessary only to pull the flap in the proper places, but a perfectly straight cut, generally produces a perfect ear. All of the dogs shown in the illustrations were cropped with straight cuts.

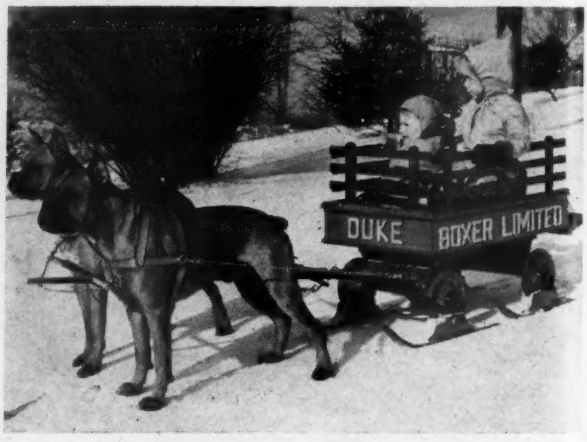
If the length of the ear is greater than the width of the jaws of the emasulatome a second application is made. One Great Dane which took two full widths was cropped and the ears stood up perfectly, but such dogs generally are poor risks. When the instrument has been allowed to stay in place for at least a minute, success is more certain than where it is clamped and removed immediately.

Then the flap beyond the jaw marks is removed by cutting along the lateral side of the line and the piece saved for use as a guide for the other ear. A very fine cutting edge needle is used threaded with 00 gut. One is dealing with delicate tissue and the two layers although pressed firmly together separate easily. Great care must be taken to so run the needle and gut through that the two layers of skin do not separate. Occasionally, this accident occurs despite the most careful handling, but even so, there is little hemorrhage and what there is does not spurt as in the case of ordinary scissor ear cropping. Interrupted sutures are preferable to an over and over stitch, because sometimes a puppy will hook a claw into such a stitch and pull out several of them. This he cannot do when the stitches are interrupted.

When the sutures are in place the puppy is turned over and cotton placed over and under the ear, which must be kept dry as we shall see. The curved forceps are applied again, the first ear flap laid on the other and a nick made with scissors at the point where it is desirable to run the line, and the emasculatome is applied. This is the point which requires the greatest care. It is also to be noted that one often finds dogs with quite unequal ears, and that must be taken into account.

The flap of the second ear is removed and the ear sutured as was the first; then the ears must be thoroughly dried if there has been any slight bleeding. To insure the best sticking of the adhesive that is then most conveniently applied, dryness is essential.

There are many successful methods of getting the ears to stay erect. The usual method is the use of aluminum guides to which the ear is taped. Some prefer to tape the ears together over the head. Some do nothing, but that is risky indeed. When the incision heals scar tissue which heals it is bound to shrink and cause a pucker in the ear. And this almost invariably occurs when the ear is allowed to hang over. The close cooperation of the client is absolutely essential. The puppy must be returned at the first dropping of the ears. If the ears are glued together with liquid adhesive such as Johnson's "duo adhesive," the edges heal with the full length and no puckering because there is always a little tension on them. The tension, by whatever method it is obtained is essential for a good job of cropping. The gut stitches are sloughed out, the ears separate in about a week or ten days, the adhesive remaining on one ear is pulled off, and the hair soon covers the ear. It is very seldom necessary to do anything further. Particularly with this operation in which there is practically no hemorrhage and the least possible manipulation of the parts there is minimum formation of scar tissue and hence less tendency for the ear to pucker than with the older operation.



The ears of this boxer team were trimmed by the method described

The client is supplied with a mild antiseptic to apply to the edges of the ear, daily. He is also cautioned to keep puppies from playing with one another, and in this way he will obtain the desired result.

There is nothing particularly difficult about the operation and in the writer's estimation every veterinarian should be able to perform it successfully.

Differential Diagnosis of Vitamin A Deficiencies and Related Ailments in Cattle

By JOHN W. PATTON
East Lansing, Michigan

IN earlier articles,[1] in which the relationship of acetonemia, ketosis, metritis, catarrhal enteritis and retained placenta were discussed, it was stated that further research into the subject was needed and that it was planned to continue the study later.

Pursuant to this objective an investigation was undertaken during the past winter which took the writer into one or more sections of nine states, where vitamin A deficiency in cattle was prevalent under a variety of feeding conditions. Reports of this study will be made at a later date, but from this survey of the disease and from contact with more than 200 veterinary practitioners it seems desirable first, to clarify the matter of diagnosis of vitamin A deficiency and to set apart the related and unrelated concomitant conditions which are commonly seen in the same herds.

In this survey, it was disclosed that a large number of veterinarians, in fact a majority of veterinary practitioners in what, for convenience, has been called the "acetonemia belt," have been using vitamin A to a greater or less extent in treating what they regard as acetonemia or vitamin A deficiency. On the whole this use of vitamin A has been attended with marked success but there have been exceptions—too many of them. Careful consideration of the problem, with these men, leads to the inevitable conclusion that opinions differ as to just what constitutes acetonemia. To make clear which cases are vitamin A deficiency, which are due to some other cause and which are vitamin A deficiency *plus* some other condition, is the object of this treatise.

In the earlier discussion it was stated that the names "acetonemia" and "ketosis" are something less than satisfactory, because they refer to symptoms or effects and not to the cause or the pathology. "Acetonemia" was used arbitrarily in that discussion for uncomplicated vitamin A deficiency which had progressed to a stage where inappetence, suppressed milk flow, wobbly gait, nervousness and eye symptoms had developed. As a result of further study, it appears discussion will be facilitated by regarding acetonemia, not as synonymous with vitamin A deficiency but as one possible stage in vitamin A deficiency. For the sake of brevity "acetonemia" is often used in this discussion to mean vitamin A deficiency in which, because of its severity or because of complications or because of a combination of factors, the condition is clinically manifested —in other words for *clinical* vitamin A deficiency.

[1] Patton, J. W., Acetonemia a vitamin A deficiency. *Vet. Med.* 39:4 and 7, pp. 150-153 and 271-278, 1944.

History Significant in Differential Diagnosis

Vitamin A Deficiency (Acetonemia).—The amount and kind of pasture and roughage available for the preceding year is important. The stresses to which the animal has been subjected in the past several weeks or months, also are important. While the animal is on pasture, unless it be poor pasture, it obtains sufficient vitamin A to supply its need and unless the stresses be severe, such as a high production of milk or rapid growth, it is able to store this vitamin in the liver for later use in times of scarcity. While the animal is on dry feed it may be getting enough vitamin A to supply its need, or enough to partially supply its need or practically none at all. It depends upon the quality of the feed in respect to vitamin A content—chiefly upon the quality of the roughage—and the output by the animal. Therefore, the shorter the pasture season and the longer the period on which the animal has been on dry feed, and particularly the poorer the quality of the roughage it has had over a prolonged period, the greater the likelihood that it is suffering from vitamin A deficiency.

As stated, what the animal has done in past months also is important. The requirement for vitamin A differs radically, depending upon what the animal is doing, i.e., putting out. A deficiency depends upon the relation between the intake and output. The animal that is merely in a condition of maintenance requires comparatively little vitamin A, and will almost never suffer from clinical vitamin A deficiency. The growing animal requires a greater quantity and, theoretically, should, in marked deprivation, suffer from clinical deficiency.

However, nature conserves its dwindling store of A by retarding growth and, as a consequence, immature animals, except young calves, seldom suffer from vitamin A deficiency severe enough to be called to the attention of the veterinarian.

Feeder steers sometimes appear to be an exception to this rule for reasons that are not clear. It should be taken into consideration, however, that frequently feeders are supplied very little roughage and that of poorer quality than is usually supplied for dairy cows. Where cotton seed hulls are the sole ration such steers regularly develop vitamin A deficiency if fed for longer than about 100 days.

The pregnant cow, ordinarily a lactating animal, has a fairly high vitamin A requirement but, like the growing animal, her store is conserved, when the intake is diminished, by a decrease in the milk flow and, also, by a retarded growth of the fetus she is carrying. The output of an animal in heavy milk production, i.e., soon after calving, is large. The output of the parturient animal, including the production of colostrum, is highest of all. The colostrum of the cow is from 10 to 100 times as rich in vitamin A, as is her milk.

It is only by considering all of the foregoing that the history of the case can be evaluated. In short, what has been the animal's opportunities to acquire and store vitamin A over the preceding months and what has been its output? It is often reported that cows develop acetonemia in the summer while on pasture. They do, but what pasture? Many pastures in the acetonemia belt are useful, chiefly as places for exercise. I have seen many of them on which there were not 10 pounds of green stuff to the acre.

Recent herd history also is revealing. Have other cows in the herd developed a similar condition? Have there been retained placentas? Have cases of metritis developed? Have the young calves suffered from scours? Is the breeding efficiency poor? Is the herd bull indifferent to animals in heat? Affirmative answers to these questions fit in with vitamin A deficiency.

The typical recent history of a cow suffering an acute attack of clinical vitamin A deficiency (acetonemia) is: A calf three days to three weeks of age. The cow did not do well after calving and has lost more flesh than is normal. Her appetite has been decreasing and she now eats only roughage and little of that. Milk production has been decreasing and is now suppressed. The placenta may have been retained and there is a 50-50 chance the calf is unthrifty or scouring. Of course there are variations in the recent history, e.g., the calf may be much older than three weeks, but the foregoing is the usual story. It is still a history of *an output of vitamin A in excess of the intake;* not of the moment but for months past.

It is common in the acetonemia belt to let cows range at large until they calve and then start feeding them. That is too late to ward off an impending attack of acetonemia (vitamin A deficiency) by feed alone.

Parturient Paresis.—Little need be said of the history in cases of milk fever, it is substantially different from the history in cases of acetonemia. The calf is usually from six to 72 hours of age; the cow a good producer; the attack sudden.

Metritis.—The history of metritis cases is essentially that of recent parturition. The only difficulty in differentiating this condition from acetonemia lies in recognition of metritis when it is present as a complication of acetonemia. Metritis is a common complication of acetonemia for reasons that are well known, but because of the more marked symptoms of the latter, the metritis is often overlooked until it reaches an advanced stage.

Plant Poisoning.—The history of plant poisoning that may be confused with vitamin A deficiency is differentiated by the sudden onset and by a number of animals being affected at the same time. In other respects the history may be the same as for vitamin A deficiency. Vitamin A deficiency is mainly responsible for the animal's eating the first shrubs and vines that start growth in the spring. Throughout the early spring, the acetonemia belt is rife with reports of wild plum, wild cherry, wild honeysuckle, yellow jasmine and holly poisoning. These poisonings are simply a result of satiating the animals' craving for something green, when nothing else is available. Crotalaria poisoning in Florida citrus groves has the same derivation. Cattle are pastured for months in pecan groves in Georgia and, although crotalaria is often present in abundance, the cattle do not eat it because grass and palatable weeds are also available. In the Florida cases of poisoning, sometimes the animals must eat crotalaria or starve, but the causal nexus for poisoning is usually the craving for vitamin A.

Atony of the Rumen.—The history of this condition may or may not resemble that of vitamin A deficiency. The coarse indigestible forage that is commonly fed to cattle in the acetonemia belt and which is to a large extent responsible for the vitamin A deficiency, when other conditions favor it, is also conducive to indigestion and constipation. A normal physiological functioning of the gut is most impor-

tant. Anything that interferes with it starts a train of ills.

Symptoms

Eye.—Among the many symptoms of acute clinical vitamin A deficiency—acetonemia—the eye symptoms are of greatest diagnostic value, because least variable. Nyctalopia, regarded as pathognomonic for vitamin A deficiency in man, is probably present, but is of little diagnostic value in cows. The veterinarian usually sees these cases in the daytime and, further, partial blindness at night is hard to detect in an animal in an environment to which it is accustomed.

Hemeralopia is probably the first symptom in an attack of acetonemia. Affected animals shun brilliant sunshine and blink frequently, when compelled to remain in it. Lacrimation soon develops and slow accommodation or its entire failure ensues. If the light from an otoscope is shone upon the cornea of an affected animal in semi-darkness, the pupil will be noted to contract but slowly or not at all. The eyes have a characteristic staring, glassy appearance. Later white deposits may be noted on the cornea.

In milk fever the pupil is dilated, the eye dull (dry) the corneal reflex impaired. Blinking is absent. The eye lids are often kept closed.

In metritis the eye is dull and the conjunctiva is of a muddy or brownish color.

The eye is variably affected in plant poisonings; no condition being characteristic of all poisonings.

In atony of the rumen and constipation the eye is dull and the cornea apt to be congested.

Urine.—The urine in acetonemia is light-colored and of low specific gravity, 1.001 to 1.009. This low specific gravity is of diagnostic importance since, except in acetonemia, it seldom occurs in this group of ailments in the cow. Probably there is a polyuria also, but that is difficult for the practitioner to determine.

Much has been said of the importance of ketone bodies in the urine in acetonemia, but finding them by means of the Ross or other tests is of no value in differential diagnosis since ketonuria is common in all related and some unrelated conditions as noted elsewhere. However, in conjunction with appropriate therapy it has a high value in differential diagnosis as will be discussed later.

In milk fever the urine, at first, has no diagnostic significance; in protracted or recurrent attacks it often reacts strongly to the Ross test, i.e., ketonuria is present.

In metritis, ketonuria may be a fairly early symptom, later the urine becomes dark and the specific gravity high. In advanced stages the urine is cloudy and may be scanty.

In many plant poisonings, ketonuria is present (after the animal has ceased eating). In poisoning by cyanogenetic plants the urine is high-colored and of high specific gravity.

In atony of the rumen, constipation, obstipation and chronic indigestion, the urine is variable, usually high-colored and copious while dehydration is in progress. As in all other conditions, when the animal is not eating for a time and is living off its own tissues, ketosis is present and the Ross test for ketone bodies in the urine is positive.

Ketosis manifested by a positive reaction of the urine to the Ross or Hayden test and by a chloroform-like odor on the breath, is referred to by some as a disease entity. It is illogical to do so and has resulted in no little confusion of non-veterinary writers on the subject. It is an effect of a disturbed carbohydrate and, or, fat metabolism. It occurs when an animal ceases to eat due to any cause or where, because of lack of absorption, it must of necessity maintain its vital processess by using up its own tissues (fat). It is always an effect, never a cause of disease. In fact it supervenes in healthy animals that are fasting; in animals on a high fat diet, during pregnancy and following ether anesthesia, i.e., it is common in relatively normal animals. Its importance as a symptom of acetonemia (in which it is nearly always present) has been greatly overemphasized and, because of this, the urine test for ketone bodies has been responsible for many wrong diagnoses and for the use of vitamin A where it was not indicated as a therapeutic agent.

Blood.—In acetonemia, blood analysis shows a low carotene and low vitamin A content and a relative hypoglycemia and hyperketonemia. In parturient paresis the blood reveals a hypocalcemia and sometimes a hypoglycemia. A ketonemia may or may not exist early in cases; in protracted cases of milk fever it is the rule.

In metritis the blood shows only such changes as may be accounted for by complications.

In plant poisoning the blood is unlikely to show changes that can be determined within the period during which treatment is useful. All the plants mentioned in this connection are cyanogenetic except *Crotalaria spectabilis* and *Gelsemium sempervirens*. The cyanogenetic plants paralyze the organs of respiration and the blood would be expected to be darker than normal. The odor of prussic acid may be present on the breath.

Position.—In vitamin A deficiency the animal is seldom down. The back is commonly arched, and may have one or more lateral curves. The head is often held high, the muzzle pointing forward. The foregoing, of course, refers to cases severe enough to be called to the attention of the veterinarian. These symptoms are due mainly to the complications and not primarily to vitamin A deficiency.

In parturient paresis the position is characteristic. Except in very early phases, the animal is down; often with the head around to the flank.

In metritis the animal stands as long as she is able. The back is arched, the tail lifted somewhat and the hind legs may be spread apart—the typical position of straining. The head may hang low when the animal walks.

In the various plant poisoning no characteristic positions are noted. These animals seldom lie down until dissolution is approaching.

In atony of the rumen and constipation, the early stage is one of lassitude and the position differs little from normal; later the flanks are tucked up and the back somewhat arched and, in advanced stages, the animal may be down.

In general, it may be said that modifications of position in these ailments are essentially only four; in milk fever there is mild tonic spasm of the lateral muscles of the neck; in acetonemia there is mild tonic spasm of the levator muscles of the neck. In acetonemia there is mild tonic spasm of the muscles of the back, in milk fever there is paraplegia. All other positions varying from normal, are those assumed to ease discomfort or relieve pain.

Gait.—In acetonemia the gait is weak and wobbly behind and it may be stiff and uncertain in front.

In parturient paresis the gait is uncertain in the beginning and soon the animal is unable to walk.

In metritis the gait is stiff and staggery, particularly in the hind limbs. As the disease progresses and weakness increases the gait becomes wobbly.

In plant poisoning the gait varies with the general condition of the animal which varies from mania to great depression and is what might be expected from those varying states.

Constipation affects the gait only as it affects the general condition; progressing from lassitude to pain and weakness.

Feces.—Clinical vitamin A deficiency (acetonemia) is almost always accompanied by mild to moderate constipation and the feces are drier than normal. With progress of the ailment, a mild catarrhal enteritis develops and mucus is mixed with the feces.

In milk fever the feces are normal except in chronic cases. In the latter there is marked constipation with mucous coated feces.

Metritis affects the feces as does other infections. They are normal at first. Later either constipation or diarrhea may develop.

In atony of the rumen the feces are hard and scanty in amount.

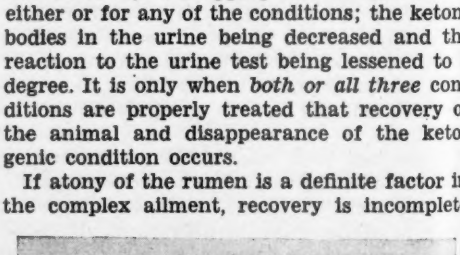
Plant Poisonings.—In these the feces vary somewhat with the poisonous agent and only exceptionally are they of diagnostic value.

Response to Therapy.—The response to treatment is significant in differential diagnosis. Many of the symptoms, if not the most important symptoms, in this group of diseases are due to the ketosis which develops and, as has been shown, derives from a variety of causes. Thus if the ketosis is due to or accompanying vitamin A deficiency it is relieved promptly by the administration of vitamin A. If it is due to metritis it is relieved by stilbestrol or other treatment; if it is due to milk fever it is relieved by calcium gluconate, etc.

The same holds true for complicating conditions. If a cow is suffering from both acetonemia and metritis, a very common occurrence, the ketosis is improved but not entirely overcome by the administration of vitamin A. The result of administration of stilbestrol is the same; the condition is improved but not relieved. The administration of *both* usually results in prompt disappearance of the ketosis, i.e., of the ketone bodies from the urine and the Ross test becomes negative.

These conditions prevail equally in milk fever complicated by vitamin A deficiency or metritis or both. The animal is improved but not cured by the appropriate treatment for either or for any of the conditions; the ketone bodies in the urine being decreased and the reaction to the urine test being lessened to a degree. It is only when *both or all three* conditions are properly treated that recovery of the animal and disappearance of the ketogenic condition occurs.

If atony of the rumen is a definite factor in the complex ailment, recovery is incomplete



until the normal physiology of the gut is established. Ordinarily, it responds to the administration of barium chloride and tartar emetic if the more acute conditions, metritis, acetonemia, etc., have been relieved.

General Discussion

The occurrence of these ailments is of some differentiating value. Acetonemia is often seen after the first and second calving; milk fever is more frequent at the third or later calvings. Acetonemia reaches its peak in prevalence about the beginning of the second week after calving; milk fever on the second day. Acetonemia is rare in good dairies; milk fever is most common in such dairies.

In acetonemia the temperature is normal; in milk fever normal or subnormal; in metritis elevated; in plant poisoning often subnormal and in atony of the rumen at first normal then elevated.

An examination of the saliva is useful in differentiating various plant poisonings from the other ailments mentioned. In poisoning the animals often drool. In poisoning by the cyanogenetic plants the saliva stains the animals' lips a deep yellow. It stains a handkerchief brown.

Many have given thiamine and a lesser number have given ascorbic acid in all these ailments, mostly with beneficial results. The cow synthesizes both these vitamins so long as the gastrointestinal system is functioning in a physiological manner. When it ceases to so function a deficiency, particularly of B_1, develops in a short time. Supplying the lacking vitamin benefits the animal temporarily but unless the deficiency be acute, such temporary lift is unnecessary All that is required, is to relieve the basic condition (atony of the rumen or other dysfunction). The animal will then manufacture its own vitamins B and C.

Vitamin B is the "critical" vitamin for the dog and for man, i.e., it is the vitamin most likely to be deficient in the rations of persons and dogs and, at the same time, one, the deprivation of which, is attendant with serious consequences. Vitamin A occupies this critical position with herbivorous animals. It (or carotene) must be obtained by these animals from outside their bodies. It is likely to be deficient in their rations for a goodly portion of the year. By selective breeding for high milk production and rapid growth, man has increased largely the requirements of domestic herbivora for vitamin A and, by confining them, he has restricted their opportunities to obtain it, by the selection of forage. And, finally, the consequences of vitamin A privation are serious.

TABLE I.—DIFFERENTIAL SYMPTOMS OF VITAMIN A DEFICIENCY, AND CERTAIN OTHER DISEASES

Ailment	History	Occurrence	Eye	Urine	Feces	Blood	Position	Gait	Response and Therapy
Vitamin A Deficiency (Acetonemia)	Consumed dry forage of poor quality much of past 6 months. Recent parturition. Recent growth or heavy milk production.	Winter and late summer in herds that are fed poor quality roughage.	Hemeralopia. Blinking. Poor accommodation. Staring. Impaired vision.	Ketonuria. Light colored. Low specific gravity. 1.001 to 1.009.	Drier than normal. Mucous coated later.	Ketonemia. Hypoglycemia.	Standing. Back arched and may be curved latterly. Muzzle pointed forward.	Weak and wobbly behind, stiff and uncertain in front. Usually cured in 48 hours by two doses.	Responds promptly to vitamin A 500,000 units.
Parturient paresis	Recent parturition. Heavy milk producer.	Parturient cows, well fed, high producers.	Dull. Unblinking. Dilated pupil. Often closed.	Ketonuria. In late stages. Sometimes in beginning.	Normal. In chronic cases dryer than normal.	Hypocalcemia. Ketonemia in advanced stages.	Down, except in early stage. Neck often kinked laterly.	Staggery at first, soon unable to walk.	Responds promptly to calcium gluconate.
Metritis	Recent parturition. Often retained placenta.	More common in poorly nourished cows.	Dull. Muddy or brownish conjunctiva.	Ketonuria. Dark colored s.g 1.025 to 1.035.	Usually normal. Watery in advanced cases.	Normal in early stage. Ketonemia later.	Standing attitude of straining. Recumbent in late stages.	Stiff and stilt-like. Disinclined to move.	Responds to irrigation and stilbestrol.
Plant Poisoning	Green grass or weeds unavailable. Access to wooded area.	Early spring or midsummer. Several animals affected.	Not characteristic.	Ketonuria in advanced stages. Dark colored in cyanogenetic.	Not characteristic.	Not characteristic.	Seldom down till near death. Sometimes convulsive.	Usually stilt-like, choppy.	May be improved by sodium hyposulfite intravenously.
Atony of rumen Constipation	Dry, coarse forage. Fasting followed by overloading. Change of feed.	Animals on inutritious feed or after radical changes in diet.	Dull. Conjunctiva congested. May be anxious expression.	Ketonuria in advanced stages.	Drier than normal. Mucous coated. Scanty.	Ketonemia. Hypoglycemia in advanced stages.	Normal. Later tucked up and reluctant to move.	Normal early. Slow and reluctant later.	Responds to barium chloride, tartar emetic and cathartics.

Clinical Reports

Six Years with Hog Cholera Vaccine

The purpose of this paper is to give my colleagues the benefit of the experience that I have gained from the use of hog cholera vaccine in my practice.

We have lived with hog cholera for a long time and it is still a major problem to the swine industry. Anti-hog cholera serum and hog cholera virus has done a magnificent job in the protection of the swine industry.

We wish to express appreciation to Doctors Dorset, Niles and McBride for their accomplishment in the discovery and development of anti-hog cholera serum and virus and for the splendid results they have achieved in protecting the swine industry against hog cholera. We are also grateful to them for their unceasing efforts in the production of a vaccine that will control hog cholera without the use of virulent virus.

I have been in practice since 1918 and have encountered more or less hog cholera every year except 1944 in which year I did not have a single case of hog cholera. I am located in central Iowa where corn and hogs are the main source of income for farmers.

Swine vaccination constitutes a major part of my practice so it is needless to say I have had plenty of experience with post-vaccination troubles. The contour of the country is flat affording poor drainage at times and creating unsanitary conditions that contribute to vaccination problems.

It has been my practice to try to have a healthy herd before administering anti-hog cholera serum and hog cholera virus. However, I have been fooled many a time in the past 26 years. I will never forget one herd of 125 pigs that were as even in size and as healthy looking as any that I have ever seen. I proceeded to treat the herd with serum and virus and when we got through the farmer said, "I have another bunch that I sorted out but I didn't think they are worth treating." I agreed with him after one look at the well coated pens. I gave him a piece of my mind for not showing or telling me anything about this lot of sick pigs before the damage was already done by the administration of virus to the apparently healthy pigs.

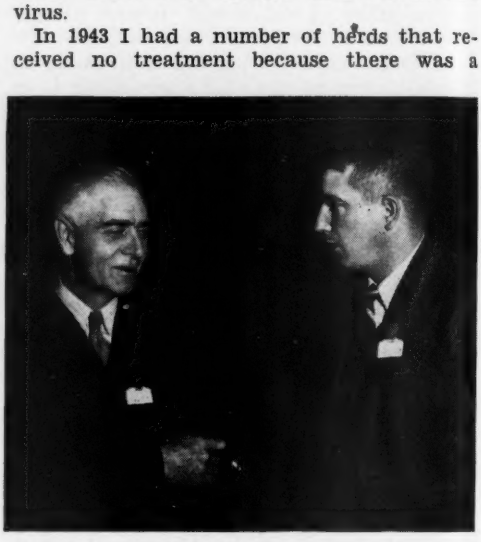
Because many of these healthy looking pigs were already infected, the use of virus on them produced most unpleasant and disastrous results.

On several farms in my territory I had encountered more or less post-vaccination troubles over a number of years. With the advent of hog cholera vaccine I began the treatment of the herds on these farms with vaccines and to my surprise no post-vaccination troubles resulting from secondary invaders were encountered. This was in 1939. The following year—1940—these clients requested that I treat their pigs with hog cholera vaccine the same as last year. A lot of their neighbors and friends asked me to use hog cholera vaccine on their herds, which I did.

In 1941 the demand increased and I was very much enthused with the favorable results so I decided to use it exclusively.

During 1942 I treated all herds with hog cholera vaccine with the exception of two herds which were treated with serum and virus.

In 1943 I had a number of herds that received no treatment because there was a shortage of vaccine and the owners preferred to risk no protection rather than to use serum and virus. Fortunately we did not have any hog cholera in the community in 1943 and these hogs went to market. However, there was a bad outbreak of hog cholera in an adjoining territory about ten miles distant.



Doctor Johnson (left) discusses vaccination

This past year—1944—I have used vaccine in all but two herds. I feel satisfied that vaccine will control hog cholera and with its use it is possible to eradicate hog cholera and reduce the losses caused by the so-called secondary invaders and virus diseases still unknown.

It is selfevident that a herd should be in good condition before it is treated with hog cholera vaccine. Herds infested with para-

sites should be treated for them and given a conditioning period before administering the vaccine.

I prefer to have the pigs weaned two weeks and administer a 5cc dose in the axillary space under aseptic precautions. Breeding stock should be re-treated in six months.

In sick herds I have used anti-hog cholera serum alone, following in three weeks with hog cholera vaccine.

Pigs that have been vaccinated with hog cholera vaccine for three weeks and not over six months should be admitted to the sales barn the same as serum and virus treated pigs if accompanied by a certificate showing when and how they had been vaccinated.

Vaccine should not be used on pigs which have been exposed to hog cholera, or with an unknown history.

Personally, I wish to express my appreciation to Doctors McBride, Cole, Boynton and their co-workers for giving us products that have afforded me as much pleasure to use as hog cholera vaccines. The favorable results I have had following their use has established my confidence in them to the point that I am attempting to create a territory free of hog cholera virus.

G. A. JOHNSON

Pomeroy, Iowa

Treatment of Azoturia in a Mule with Vitamin B_1

March 21, 1944, I made a call in an adjoining county to see a mule that the neighborhood talent had worked over for "kidney disease." On arrival I found a mare mule down and unable to rise, with the typical symptoms of azoturia including coffee-colored, "sticky" urine. She was sweating and nervous and excitable but not struggling—when they let her alone.

The history was that she had gone down that morning in the field shortly after going to work and had been in the same condition, in which I found her, for six hours. As the field was a mile from the barn and, in addition to walking that distance she had worked for a short time, it is evident the ailment had not struck her as quickly as it usually does after the beginning of exercise.

I gave this animal 70,000 units of thiamine hydrochloride hypodermically and was leaving when a torrential rain set in. The mule was covered with a tarpaulin and a tent put up for a caretaker.

The owner called up the next day and said the mule was still alive but that was about all and asked that I come to see her again. I realize now that the dose of thiamine was insufficient but this was one of the first cases in which I had used it.

My assistant made the second call to this case and gave the animal 120,000 units of thiamine. The next morning the owner reported that the mule got up about two hours after the doctor left and slowly walked to the barn of her own accord, resting a number of times on the way. She made an uneventful recovery and was back at work in a few days.

Some have questioned the occurrence of azoturia in mules. This case was as typical and unmistakable as any I have ever seen in a horse.

I have used the vitamin B_1 treatment advocated by Doctor Patton[1] on six other cases of azoturia and the results have been good in all of them.

R. E. BAUCH

Knoxville, Tenn.

Coryza or Colds in Chickens

In just about every copy of a poultry or farm magazine that one picks up there is an article on coryza in chickens; and veterinary magazines, too, give a lot of space to this subject. Practically all such articles recommend a lot of high-sounding, complicated treatments and cite varied and diverse immediate and predisposing causes. I have yet to read an article that has given me much help in the treatment or which I think brings to light the real cause of coryza in chickens.

I doubt that there is a flock of chickens in my territory that hasn't been bothered with "colds." After the many dippings, sprayings, nose drops, and antiseptics in the drinking water recommended by the articles in the magazines and by hatchery men and remedy salesmen have all been tried, the owners eventually come to me for help in their trouble. It will be seen I have no reputation as a poultry expert but only as a general practitioner to go to as a last resort.

I believe the organism causing coryza, *Hemophilus gallinarum* is ubiquitus—omnipresent in every flock. When the resistance of the bird becomes lowered sufficiently from any cause, the organisms are enabled to set up a "cold." It has been my experience that by eliminating the original predisposing cause the spread of "colds" is stopped.

In every case of coryza in which I am consulted, I always hold a necropsy on one or more chickens. In about one-half of the cases the birds have lice or blue bugs. Many are heavily infested with internal parasites. Prac-

[1] Patton, J. W. A new conception of azoturia. *Vet. Med.* 39:1, p. 10, 1944.

Clinical Reports

Six Years with Hog Cholera Vaccine

The purpose of this paper is to give my colleagues the benefit of the experience that I have gained from the use of hog cholera vaccine in my practice.

We have lived with hog cholera for a long time and it is still a major problem to the swine industry. Anti-hog cholera serum and hog cholera virus has done a magnificent job in the protection of the swine industry.

We wish to express appreciation to Doctors Dorset, Niles and McBride for their accomplishment in the discovery and development of anti-hog cholera serum and virus and for the splendid results they have achieved in protecting the swine industry against hog cholera. We are also grateful to them for their unceasing efforts in the production of a vaccine that will control hog cholera without the use of virulent virus.

I have been in practice since 1918 and have encountered more or less hog cholera every year except 1944 in which year I did not have a single case of hog cholera. I am located in central Iowa where corn and hogs are the main source of income for farmers.

Swine vaccination constitutes a major part of my practice so it is needless to say I have had plenty of experience with post-vaccination troubles. The contour of the country is flat affording poor drainage at times and creating unsanitary conditions that contribute to vaccination problems.

It has been my practice to try to have a healthy herd before administering anti-hog cholera serum and hog cholera virus. However, I have been fooled many a time in the past 26 years. I will never forget one herd of 125 pigs that were as even in size and as healthy looking as any that I have ever seen. I proceeded to treat the herd with serum and virus and when we got through the farmer said, "I have another bunch that I sorted out but I didn't think they are worth treating." I agreed with him after one look at the well coated pens. I gave him a piece of my mind for not showing or telling me anything about this lot of sick pigs before the damage was already done by the administration of virus to the apparently healthy pigs.

Because many of these healthy looking pigs were already infected, the use of virus on them produced most unpleasant and disastrous results.

On several farms in my territory I had encountered more or less post-vaccination troubles over a number of years. With the advent of hog cholera vaccine I began the treatment of the herds on these farms with vaccines and to my surprise no post-vaccination troubles resulting from secondary invaders were encountered. This was in 1939. The following year—1940—these clients requested that I treat their pigs with hog cholera vaccine the same as last year. A lot of their neighbors and friends asked me to use hog cholera vaccine on their herds, which I did.

In 1941 the demand increased and I was very much enthused with the favorable results so I decided to use it exclusively.

During 1942 I treated all herds with hog cholera vaccine with the exception of two herds which were treated with serum and virus.

In 1943 I had a number of herds that received no treatment because there was a

Doctor Johnson (left) discusses vaccination

shortage of vaccine and the owners preferred to risk no protection rather than to use serum and virus. Fortunately we did not have any hog cholera in the community in 1943 and these hogs went to market. However, there was a bad outbreak of hog cholera in an adjoining territory about ten miles distant.

This past year—1944—I have used vaccine in all but two herds. I feel satisfied that vaccine will control hog cholera and with its use it is possible to eradicate hog cholera and reduce the losses caused by the so-called secondary invaders and virus diseases still unknown.

It is selfevident that a herd should be in good condition before it is treated with hog cholera vaccine. Herds infested with para-

sites should be treated for them and given a conditioning period before administering the vaccine.

I prefer to have the pigs weaned two weeks and administer a 5cc dose in the axillary space under aseptic precautions. Breeding stock should be re-treated in six months.

In sick herds I have used anti-hog cholera serum alone, following in three weeks with hog cholera vaccine.

Pigs that have been vaccinated with hog cholera vaccine for three weeks and not over six months should be admitted to the sales barn the same as serum and virus treated pigs if accompanied by a certificate showing when and how they had been vaccinated.

Vaccine should not be used on pigs which have been exposed to hog cholera, or with an unknown history.

Personally, I wish to express my appreciation to Doctors McBride, Cole, Boynton and their co-workers for giving us products that have afforded me as much pleasure to use as hog cholera vaccines. The favorable results I have had following their use has established my confidence in them to the point that I am attempting to create a territory free of hog cholera virus.

G. A. JOHNSON

Pomeroy, Iowa

Treatment of Azoturia in a Mule with Vitamin B_1

March 21, 1944, I made a call in an adjoining county to see a mule that the neighborhood talent had worked over for "kidney disease." On arrival I found a mare mule down and unable to rise, with the typical symptoms of azoturia including coffee-colored, "sticky" urine. She was sweating and nervous and excitable but not struggling—when they let her alone.

The history was that she had gone down that morning in the field shortly after going to work and had been in the same condition, in which I found her, for six hours. As the field was a mile from the barn and, in addition to walking that distance she had worked for a short time, it is evident the ailment had not struck her as quickly as it usually does after the beginning of exercise.

I gave this animal 70,000 units of thiamine hydrochloride hypodermically and was leaving when a torrential rain set in. The mule was covered with a tarpaulin and a tent put up for a caretaker.

The owner called up the next day and said the mule was still alive but that was about all and asked that I come to see her again. I realize now that the dose of thiamine was insufficient but this was one of the first cases in which I had used it.

My assistant made the second call to this case and gave the animal 120,000 units of thiamine. The next morning the owner reported that the mule got up about two hours after the doctor left and slowly walked to the barn of her own accord, resting a number of times on the way. She made an uneventful recovery and was back at work in a few days.

Some have questioned the occurrence of azoturia in mules. This case was as typical and unmistakable as any I have ever seen in a horse.

I have used the vitamin B_1 treatment advocated by Doctor Patton[1] on six other cases of azoturia and the results have been good in all of them.

R. E. BAUCH

Knoxville, Tenn.

Coryza or Colds in Chickens

In just about every copy of a poultry or farm magazine that one picks up there is an article on coryza in chickens; and veterinary magazines, too, give a lot of space to this subject. Practically all such articles recommend a lot of high-sounding, complicated treatments and cite varied and diverse immediate and predisposing causes. I have yet to read an article that has given me much help in the treatment or which I think brings to light the real cause of coryza in chickens.

I doubt that there is a flock of chickens in my territory that hasn't been bothered with "colds." After the many dippings, sprayings, nose drops, and antiseptics in the drinking water recommended by the articles in the magazines and by hatchery men and remedy salesmen have all been tried, the owners eventually come to me for help in their trouble. It will be seen I have no reputation as a poultry expert but only as a general practitioner to go to as a last resort.

I believe the organism causing coryza, *Hemophilus gallinarum* is ubiquitus—omnipresent in every flock. When the resistance of the bird becomes lowered sufficiently from any cause, the organisms are enabled to set up a "cold." It has been my experience that by eliminating the original predisposing cause the spread of "colds" is stopped.

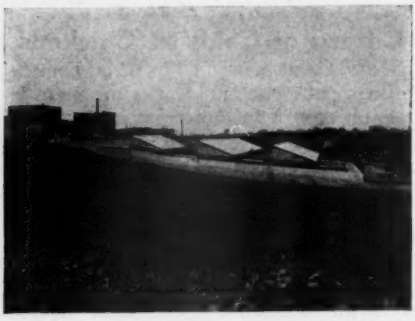
In every case of coryza in which I am consulted, I always hold a necropsy on one or more chickens. In about one-half of the cases the birds have lice or blue bugs. Many are heavily infested with internal parasites. Prac-

[1] Patton, J. W. A new conception of azoturia. *Vet. Med.* 39:1, p. 10, 1944.

tically all need correction of the rations—usually more protein and more vitamin A are needed.

In nine of every 10 birds I "post," I find a condition which I have not seen mentioned in any book, including "Biester and Devries."

Upon necropsy, whether the crops are empty or engorged, there is always a foul odor. Microscopic examination of the contents of the crop reveals a movement similar to that of tadpoles in a mud puddle. I think it probable this is some species of trichomonad, but they are too small to be seen as individuals under the 440 power of the microscope. However, the movements can be seen. I find among these birds a few trichomonads of considerable size in the crop, but usually only the movement is seen. The organisms die in a very short time in the carcass or when removed from the body. Some may ask why I have not sent some of this crop material to some laboratory for identification. I have, but these unknown organisms, whatever they were, were dead and could not be distinguished upon examination at the laboratory.



If chickens roost close and are crowded, look to ventilation

Placing these flocks upon a 1:2000 solution of copper sulfate not only has stopped the loss of birds but has stopped the spread of coryza in every flock so treated. Of course, such improvements in feeding and management as are deemed necessary are made also.

Inquiry is always made of a client as to how many chickens he has to a house; and whether they roost close, spread out or bunch up in the corners. In this way one is able to ascertain and correct the draft conditions of the house. I have even built a model chicken house with indirect ventilation which has stimulated a great deal of interest among poultry raisers and is recommended highly by the county agent. One of the leading lumber yards here is building this type house in its yards throughout this territory and Southern Oklahoma.

My treatment is simple. First, eliminate the predisposing cause, then give sulfathiazole in the mash or a tablet daily by mouth to sick birds. Place copper sulfate in the drinking water of all birds; employ good sanitation and feed a balanced diet.

The causes of coryza are poor rations; parasites, both external and internal; bad ventilation, particularly drafts; crowding; insanitation and diseases such as pox.

I may be "sticking my neck out" by writing this article but I have built up a good poultry practice by following this procedure.

G. B. ADAMS.

Vernon, Texas

Quick Recoveries in Azoturia

Since the first report[1] of good results from the use of vitamin B_1 in azoturia, I have been employing it in the treatment of this ailment. My treatment of this disease previously had left a good deal to be desired and I was ready to try almost any new treatment suggested. I have used vitamin B_1 (thiamine hydrochloride) alone in some cases and in combinations with dextrose, calcium and magnesium in others. The following reports are typical for the cases treated and the results obtained:

Case No. 1.—November 20, 1944, at 3:00 p.m., I was called 20 miles to see a seven-year-old, 1200-pound, spotted mare that was down in the woods. She had not been worked for three days, owing to a wet spell of weather, but had been put to work that afternoon. In a short time she began to sweat profusely, according to the owner, became stiff, then staggered, went down and was unable to rise.

Of course I surmised it was a case of azoturia and that is just what I found. This mare was lying on her side, excited, struggling and sweating. Catheterization revealed coffee-colored urine. The gluteal muscles were swollen and "hard as rocks."

I gave her 50,000 units of thiamine and 500cc of D.C.M. intravenously and also an aloetic ball.

At ten o'clock the next morning I was called again. The animal was in practically the same condition as when I first saw her. She had now been down nearly 24 hours and the prognosis didn't look so good. I catheterized the mare again and gave her 150,000 units of thiamine and told the owner to let me know if she got up.

I heard nothing from this case till the next morning, when the owner phoned me that the

[1] Patton, J. W., A new conception of azoturia. *Vet. Med.*, 39:1, p. 10, 1944.

mare got up, a couple of hours after I left the preceding day, and that this morning she looked pretty well. However he thought I better come out again.

On arrival that afternoon I found the mare practically normal. I gave her 70,000 units of thiamine as a precautionary measure and in a few days she was put back at work and experienced no further trouble.

Case No. 2.—December 7th at 9:00 a.m. I received word to call and see a mule that was down and couldn't get up.

I found a 1200-pound mule with the characteristic symptoms of azoturia—down, unable to rise, threshing around, coffee-colored urine, etc. This animal had been kept in the barn only two days and, when turned into the barnyard that morning, had not walked more than 50 feet until he reeled, staggered and went down. The owner couldn't get him onto his feet again. At least this is the story told to me, although it does seem a bit unusual for the history of an attack of azoturia, and an attack of azoturia it certainly was.

I catheterized the mule and gave him 130,000 units of thiamine hydrochloride subcutaneously and left, telling the owner to call me if there was any change in the animal's condition. Not hearing from him by the following morning, I telephoned him and was told the mule got up of his own accord shortly after I left and went into the barn; and that he was all right and eating. Doubting that such a case could recover completely in 24 hours, I instructed the owner to let the animal rest three or four more days before working him. He followed these instructions by putting him to work the next morning, 48 hours after the attack and, later, stated that the mule worked as well as ever.

Case No. 3.—November 11th I was called to see a high-class 1100-pound saddle horse that was down and unable to rise. As with Case No. 2 this had a rather unusual history. The horse had been ridden 15 miles two days previously and had stood in the barn since. On the morning that I was called they had found the animal down in the stable. He had been all right at feeding time the preceding evening.

The symptoms were those common to azoturia, excitement, sweating, struggling, enlarged firm gluteals, etc. Only a small quantity of urine could be obtained through the catheter. It was characteristically coffee-colored. A number of the neighbors were standing around and when I told the owner that his horse had azoturia, he tried hard to give him to anyone who would pay for my call, but without success.

I gave the animal 120,000 units of thiamine hydrochloride subcutaneously and an aloes ball.

The owner phoned me the next morning to report that the horse got up, unaided, about four hours after I left and was now all right, adding that he surely would have lost a lot of money if anyone had taken him up on his offer to give the animal away, as the horse was worth $300 of any man's money.

Four days later he began riding the horse again.

Dr. J. W. Patton of East Lansing, Michigan, was through here a few days ago and I was discussing these and many other cases with

First recorded case of azoturia treated with vitamin B_1

him. I think he gave me a good tip on the treatment of azoturia. It is his contention that dextrose is definitely contra-indicated in azoturia. In this disease there is an enormous accumulation of glycogen in the tissues. The administration of dextrose, which is changed into glycogen as the first step in metabolism, is like adding fuel to the fire or carrying coals to New Castle. He says that B_1 will cure azoturia in spite of dextrose, if one gives enough of it; but that recovery is surer and prompter if the condition is not aggravated by the addition of more sugar to the already overloaded system.

Commenting on Case No. 1, he states that the first dose of thiamine was inadequate. Around 125,000 units is the minimum dose from which one can expect uniform, prompt recovery in a 1000-pound animal and if the case is particularly severe or of several hours' duration, a larger dose is justified. Overdosage is practically impossible in the sense that it would harm the animal—the only harm being to the owner's pocketbook.

W. L. STROUP

Corinth, Miss.

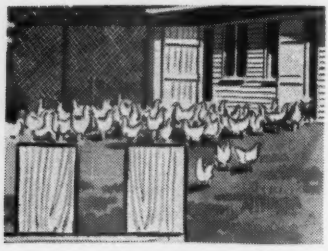
★ ★ ★ BUY WAR BONDS ★ ★ ★
AND HOLD THEM

Abstracts

Improved Sanitation Urged for Processing and Marketing Poultry Meat

It has been said of a certain Southwestern State that, because of its atrocious climate, no one would live there if it were not such a wonderful state. In the same vein one might say if poultry meat were not such a wonderful food no one but a hyena would eat it, considering the insanitary manner in which it is handled. There are persons who become so accustomed to it that they miss, longingly, the "barny flavor" when given a drink of clean milk, but the writer has yet to meet a person who preferred the carrion taste and odor of 99% of undrawn market fowl to that of the freshly killed bird.

Lynn[49] makes a forceful plea for reform in



Poultry may be and often is raised with the greatest of care and then the fine flavor of the meat all but destroyed by the way it is handled on the market

the methods of processing and distributing poultry meat. A half century ago, poultry in the channels of trade was largely live birds. They were killed and eviscerated but a few hours, at most, before being served on the dining table. Within recent years the poultry industry has grown to be our second livestock industry in point of size but with a notable disregard of esthetic concepts, sanitation and even common cleanliness in its marketing of poultry meat. A large preponderance of the poultry that enters the lanes of distribution is more or less indifferently bled, plucked, cooled in any period up to six or seven hours, chilled and perhaps frozen with head and feet still attached, abdominal and thoracic viscera *in situ*. For days or months, the teeming putrefactive organisms of the intestinal canal have such opportunity as refrigeration permits to plump the carcass with foul gases and invade edible tissues, an enterprise requiring only hours under conditions that usually prevail somewhere along the way between the sticking rack and the consumer's table.

The beef packer employes butchers to eviscerate his animals and then supplies his customers cuts of their choice. The poultry packer expects the housewife to eviscerate his birds or the salesman in the meat market to do it in her presence, which, naturally, doesn't increase the appetite for chicken. Then he demands that she take the whole bird or nothing.

Lynn argues that reform of these outmoded methods is long overdue. That success awaits the poultry packer who will supply a wholesome sanitary product ready for the skillet, kettle or oven. If the buyer wants a half-dozen thighs she should not be required to take also a half-dozen feet and three backs, etc., which she doesn't want—not to mention the viscera. If she has use only for white meat it doesn't encourage increased consumption to require her to buy several necks also. If she wants the whole bird she should be able to buy it without inedible parts, including pin feathers; and the wholesomeness of the carcass should be certified by competent inspection.

The author thinks that bringing the poultry marketing up to the sanitary, hygienic and trade standards of other meats must wait for wide distribution of "deep freezers" in retail food establishments. He expects this development early in the post-war period and urges the poultry industry, particularly that part of it concerned with slaughtering and marketing, to prepare for this innovation.

Liability for Sale of Unwholesome and Contaminated Food

Three recent court decisions[44] as to liability for unwholesome food products are of more than usual interest. Two of the cases concerned trichinosis. One was a suit for damages from a retailer because of the death of a customer who contracted trichinosis from eating mettwurst which the dealer had prepared from fresh pork shoulders and hams. The plaintiff was awarded $3000. The court observed, however, that had the decedent eaten the raw shoulder or ham as it came from the slaughtered animal a different conclusion as to contributory negligence might have been required.

In the second case a retailer was sued because of trichinosis contracted by eating inadequately cooked pork shoulder. In this case the dealer was absolved solely on the ground of contributory negligence on the part of the plaintiff. The court ruled that the inability

[49] Lynn, Edward M. Proposed pattern for poultry-meat marketing. *J. A. V. M. A.* 106:3, p. 145, 1945.

[44] Rudnick, H. L., Three interesting food decisions by the Ohio Supreme Court analyzed. *Nat'l Prov.* 112:6, 1945.

of the seller to make an inspection [of the raw pork shoulders] does not relieve him of responsibility and that Trichinella infected meat does not qualify as wholesome within the meaning of the statute; i.e., it is negligence *per se* to sell pork infected with Trichinella, even though the seller does not know and has no practical means of knowing the pork is infected.

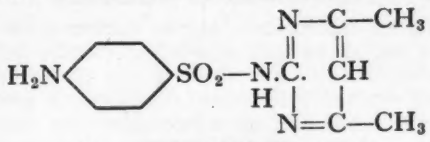
In the third case a dealer was held liable in damages for illness resulting from finding worms in a can of peaches. In this case the court said "Ignorance of the unwholesome condition of food is no excuse for the seller."

These decisions emphasize a recent[45] statement in these columns "Over a period of years there has been a definite trend in the law placing greater obligations of care and caution upon the food manufacturer (and purveyor)."

Sulphamethazine Effective in the Treatment of Coccidiosis in Chickens

Research[46] at the Veterinary Laboratory (British) Ministry of Agriculture demonstrated that pure sulfamezathine (sulfamethazine) added to the ration at the rate of 1 to 2% prevented death from cecal coccidiosis in experimentally infected chickens. This was true even when treatment was not commenced until 72 to 96 hours after infection with a lethal dose of sporulated oocysts. Subsequently,[47] substitution of a saturated solution of the drug for the drinking water was shown to prevent the development of the disease in chickens that had received 100 times the known lethal dose of sporulated oocysts and, still later, that the use of this solution as a beverage at the first appearance of symptoms, in an experimentally infected flock, reduced the mortality 45% as compared with untreated control chickens.

In an experiment[48] to determine the effect of the substitution of a saturated solution of sulfamezathine for the drinking water under conditions simulating an outbreak of coccidiosis on a poultry farm, 100 chicks were divided into two lots of 50 each. Equal numbers of sporulated oocysts were then sprayed on the sawdust litter of both pens. The sulfamezathine solution was substituted for the drinking water in one lot. The other lot constituted the untreated controls. The percentage of death losses in three trials were: Treated



SULFAMETHAZINE
2—Sulfanilamido—4, 6 dimethylpyrimidine—a dimethyl derivative of sulfadiazine

chicks, 18, 19 and 12; average 16%. Untreated controls, 80, 69 and 65, average 71%.

A further experiment was undertaken to determine the susceptibility of the treated survivors to reinfection with coccidia. They were shown to possess a strong immunity.

Dried Cow Manure and Dried Rumen Contents in the Poultry Ration

The results of experiments[52] showed beyond question that dried cow manure and dried rumen contents were superior to the alfalfa leaf meal used in the simple wartime diet that was fed, even though this diet contained adequate quantities of vitamin A and riboflavin.

The androgenic effect of cow manure, which is objectionable if the chicks are to be raised for egg production or breeding purposes, can be eliminated by slow drying at a low temperature or by drying at 80° C. or above. The androgenic principle is not present in dried rumen contents.

Because of the shortages of high grade alfalfa meal and fish meal, cow manure or dried rumen contents may assume considerable practical importance in poultry feeding. Drying temperatures of 80° C. or above are sufficient to destroy harmful bacteria that may be present. Dried cow manure not only effectively supplements a simple wartime diet composed chiefly of wheat and soybean meal but also adds significant quantities of riboflavin. Dried rumen contents are equally effective and contain nearly three times as much riboflavin as dried cow manure.

If the rumen contents available at commercial slaughter houses were dried for us in poultry feeds it is estimated by the writer that 87,500 tons of material would be produced containing over 2,300 pounds of riboflavin. If these dried rumen contents were used as 8% of starting mashes they would supply one-third of the riboflavin required for nearly a million tons of feed.

[45] Liability for food poisoning. *Vet. Med.* 40:2, p. 41, 1945.
[46] Horton-Smith, C., and Taylor, E. R., Sulfamethazine and sulfadiazine treatment in cecal coccidiosis of chickens. *Vet. Rec.* 54, p. 516, 1942.
[47] ——, Saturated solution of sulfamethazine as a substitute for drinking water in the treatment of cecal coccidiosis in chickens. *Ibid.* 55, p. 109, 1943.
[48] ——, Sulfamezathine in the drinking water as a treatment for cecal coccidiosis in chickens. *Ibid.* 57, p. 35, 1945.

[52] Hammond, John C. Dried cow manure and dried rumen contents as a partial substitute for alfalfa leaf meal. *Paul. Sci.* 23, pp. 471-476.

Milk Used as a Drink Favors Tapeworms in Chickens

In an experiment[50] at the Kansas station, two lots of chickens were fed a common farm ration, yellow corn, wheat, green alfalfa hay and crushed lime stone. One lot was given liquid skim milk as a beverage; the other water. At the end of 10 months 91.1% of the birds receiving milk were infested with tapeworms but only 51.3% of the other lot was infested. The reverse obtained for infestation of round and cecal worms; the lot receiving no milk having a markedly higher infestation. There was only a moderate difference in the average weight of the hens in the two lots (milkfed 4.52 pounds, the controls 4.11 pounds) and no difference in egg production.

It is postulated that the heavy infestation of tapeworms in the lot receiving milk was due to the attraction of the milk for flies, the intermediate host of the tapeworm. The lighter infestation of round and cecal worms in this lot is surmised to have been due either to the competition of the tapeworms or possibly because milk is not conducive to the development of cecal and roundworms.

Convenient Preparation of Normal Saline Solution

Moerke[57] gives a simple convenient method of preparing any quantity of normal saline solution without the necessity for weighing the sodium chloride to determine accurately the percentage strength.

An isotonic, physiological or normal saline solution is one containing 0.9% of salt (sometimes given 0.85%). To prepare a solution accurate within 0.01gm of salt per 100cc of solution at room temperature range, the author directs that a stock solution of saturated sodium chloride solution be prepared by pouring distilled water into a bottle which contains a heavy layer of salt at the bottom, and agitating it until the water has dissolved all the salt that it will. As the solution is used up additional distilled water is added and when necessary the salt is replenished.

To prepare "normal" saline solution 2.6cc of the saturated solution is added to 100cc of distilled water; 13cc for 500cc and 26cc for 1000cc. For nearly absolute constancy of concentration the amount of saturated solution used may be decreased 1% for each 10°c. above 18°C. (64.4°F.) and increased 1% for each 10° below 18°C. However for practical purposes no correction is needed for temperature changes.

Like normal saline solution made in any other manner, it should be filtered before being used intravenously.

Unusual Dystocia in Swine

A clinical description[63] is given of a type of dystocia occurring in pigs, characterized by eversion of the vagina immediately before or during parturition, due to violent expulsive efforts arising from the presence in the vagina of numerous voluminous "cysts." The condition has been seen only after the third or fourth gestation period. The "cysts" are finger-like, rounded, or grape-like projections of the vaginal mucosa, and tend to occur in a zonal band, and not along the whole length of the vagina. They are fibrovascular structures, infiltrated with a yellowish edematous fluid, which apparently increase rapidly in size about the time of parturition and act as obstructing and irritant foreign bodies. Methods of dealing with the dystocia are described in detail, and consist essentially of repulsion of the vagina and manual delivery of the fetuses. Affected swine tend to show an increase in number and size of the "cysts" at successive gestations, and it is therefore recommended that they be fattened for slaughter.

Effective Uses of Penicillin

It has been found by officers of the Medical Corps in experiments[53] carried on at Fort Jay Regional Hospital that patients with severe streptococcus sore throats improved within eight to 12 hours after the first injection of penicillin and within 24 to 36 hours the cultures were almost always negative. However, unless the treatment was continued for six days there were clinical relapses. Treatment consisted of 15,000 units of penicillin intramuscularly every four hours.

In a case of Rocky Mountain spotted fever reported,[54] 100,000 units of penicillin added to 50cc of isotonic sodium chloride solution and given by drip intravenously, the temperature was reduced from 105 to 100° F. within two hours. There was definite improvement in this time and the patient recovered. Sulfonamides had been given previous to the penicillin therapy but proved ineffective.

[50] *Poultry Science*, Jan., 1945.
[57] Moerke, Georgine A. Physiological saline without weighings. *J. Lab. & Clin. Med.* 30:2, p. 186, 1945.
[63] Prioux eau, M., Dystocie par kystes vaginaux multiples chez la truie. [Dystokia in the Sow due to Multiple Vaginal Cysts].—*Rec. Méd. vét.* 119. 10-13, 1943. Abst. in *Vet. Bul.*
[53] Penicillin therapy in hemolytic streptococcic pharyngitis and tonsilitis. Plummer, Norman, Maj., Warren, H. J., Maj., *et al., J. Am. Med. Assn.*, 127:7, pp. 369-374, 1945.
[54] Rocky Mountain Spotted Fever: Treatment with Penicillin. Edmunds, P. K., *Rocky Mt. Med. J.*, 41, p. 910 (Dec.), 1944.

Treatment of Induced Shock in Dogs

The application of tourniquets to both hind legs of unanesthetized dogs for five hours is not always followed by shock. If shock occurs, it is of moderate intensity. Saline solution given intravenously is curative.

The application of tourniquets to unanesthetized dogs for eight to 11 hours uniformly produces shock,[56] which is fatal if untreated. Plasma administered intravenously, 5% bovine albumin in saline solution or 25% bovine albumin supplemented by peroral fluid are effective therapeutic agents, if the deficiency in plasma volume is made good while the blood pressure is above 60mm of mercury. Occasionally, they may be effective at blood pressures between 60 and 40mm physiologic saline, 25% albumin without peroral fluid, and 5% saline with peroral water are not effective.

The critical blood pressure level of tourniquet shock is much higher than that of hemorrhagic shock. This may be related to deleterious effect of the increased blood viscosity of tourniquet shock on cardiac output. Consequently, the high viscosity requires that plasma or plasma substitutes rather than whole blood be the agent of choice for blood volume replacement therapy.

Cure of five-hour tourniquet shock, attributed by other investigators to succinic acid, is achieved by saline therapy alone in experiments in which anesthesia is omitted. It is therefore apparent that any value sodium succinate may have demonstrated in studies by other investigators may be attributable to its ability to counteract the depressing effect of barbiturates.—*H. J. M.*

Mineral Deficiency in Farm Animals

The importance of minerals in a diet has only recently been appreciated.[55] Osteodystrophia fibrosa (osteomalacia) may be produced in horses when the ratio of $CaO:P_2O_5$ is between 1:9 and 1:19. Exostoses may be due to depletion in the mineral reserves of the skeleton. Lack of calcium in poultry tends to produce poor calcification, especially if the supply of vitamin D is insufficient. A deficiency of calcium results also in low egg production and imperfect egg shells. Anestrus in cattle is reported as being an indication of mineral deficiency, a low phosphorus or a wide calcium phosphorus ratio retards or lengthens the estrus cycle. A deficiency of calcium in weaned pigs results in anorexia, unthriftiness, incoördination of movement leading to paralysis, lack of growth and poor utilization of food. Rachitis is met with in pigs where the ration is deficient in calcium and phosphorus with lack of vitamin D. Recently phosphorus in the form of dilute phosphoric acid has been employed successfully in the treatment of "stiff lamb disease" in Canada. A tetany with a low blood magnesium and normal calcium and phosphorus has been reported in calves fed exclusively on milk.

There are no reserves of sodium and chlorine in the body; their excretion may, however, be controlled by the animal when the food is deficient in these elements. The detrimental effects of a deficiency may therefore not arise for some time. Lactating animals should be provided with salt licks or rations to which salt has been added. Lack of sodium chloride causes or predisposes to contagious necrosis of the skin of camels in India and Somaliland.

Nutritional anemia of unweaned pigs, characterized by white scour at a few weeks old, with pallor of the skin, is usually the result of an iron deficiency. Iron and copper deficiencies have been responsible for anemia in chicks. Nutritional anemia in pigs is associated with a copper as well as an iron deficiency.

"Neck-ail" in Massachusetts, "nakuruitis" in Kenya and "vinquish" in Scotland are connected with a deficiency of cobalt in the ration.

Where goiter is due to an iodine deficiency the addition of iodine to the ration is beneficial.

Industrial fluorosis has been encountered in various parts of England among cattle grazing in the neighborhood of factories producing hydrochloric acid, enamel and aluminum, and in the vicinity of brickworks. Affected animals show lameness and enlargement on manipulation of the bones, cachexia and mottling of the teeth. Every effort should be made to improve the soil by drainage and suitable manuring so that mineral-rich plants can be grown readily as forage crops or for hay or silage.

Milk does not contain a sufficient quantity of certain minerals (iron, copper, iodine) for normal growth and development. Most meals and gruels, made with crushed seeds and their by-products contain enough phosphates but are poor in calcium (and often in magnesium). Good quality hays have adequate minerals in blades and stems but not in flowering heads. —*A. H. Bryan.*

[56] Fine, Frank and Seligman, The therapy and hemodynamics of tourniquet shock in dogs. *J. Clin. Invest.*, 23, p. 731, 1944.

[55] O'Connor, J. D. Effects of mineral deficiencies in the diet of livestock. *Vet. Rec.*, 56:38, pp. 337-342, 1944.

Book Reviews

Introduction to Parasitology with Special Reference to the Parasites of Man. By *Asa C. Chandler,* M.S., Ph.D., Professor of Biology, Rice Institute; Special Consultant, Malaria Control in War Areas, U. S. Public Health Service; former Officer-in-Charge, Hookworm Research Laboratory, School of Tropical Medicine and Hygiene, Calcutta, India. 7th edition; 716 pages, 309 illustrations. Published by John Wiley & Sons, New York. 1944. Price $5.00.

This work is strongly slanted to medical parasitology and the brief discussions of parasites of animals and animal parasitisms cannot be regarded as an adequate introduction to veterinary parasitology even with the excellent discussions of the life history of the parasites. However, the introduction to the text and the history of parasitology are worth the modest price of the work, which is only about one-half that of the usual medical text book of this size.

One of the most agreeable features of the work is the forthright, clear, pleasing style in which it is written. In this field it has too few competitors among scientific books.

* * * *

The March of Medicine. The New York Academy of Medicine Lectures to the Laity, 1944. 121 pages. Published by Columbia University Press, New York, 1945. Price $1.75.

This little book comprises six popular lectures—Morale and Propaganda by *Edward A. Strecker,* M.D., President, American Psychiatric Association; Food and Civilization by *Charles Glen King,* Ph.D., Scientific Director, The Nutrition Foundation, Inc.; The Past, Present and Future of Chemotherapy by *Cohn M. MacLeod,* M.D., Professor of Bacteriology, New York University College of Medicine; Medicine and the Changing World by *Reginald Fitz,* M.D., Lecturer on the History of Medicine, Harvard University Medical School; The Effects of Science Upon Human Beings by *Sir Gerald Campbell,* British Minister to Washington, and Wars and Epidemics by *Lt. Col. Thomas T. Mackie,* M.C., A.U.S., Executive Officer, Tropical Medicine, Army Medical Center, Washington, D. C.

The subjects are timely. The men who discuss them are leaders in the fields to which the subjects pertain and an extraordinary amount of interesting and useful information is condensed into surprisingly few pages. Thus 110 pages of text matter require nine pages of index to simply list the topics discussed. To review each of these lectures adequately would exceed the limits of space available. The following statements from the last lecture are indicative of the scholarship and interest of the whole.

The oldest recorded epidemic is the Athenian plague (536 B.C.). A dysentery decimated the Peloponnesian armies, drove the invaders from Attica, saved Athens and turned the current of history. Forty years later an epidemic prevented the Carthaginians from conquering Sicily. This, in turn, affected the outcome of the Punic Wars and may have postponed for a thousand years the development of a commercial civilization in Europe. In A.D. 80 an epidemic started the westward migration of the Huns. The "plague of Galen" (A.D. 165) depopulated cities, destroyed agriculture, paralyzed commerce and immobilized the Roman armies and, followed by the plague of Justinian, was probably a crucial factor in the breakdown of the empire and conquest by the barbarians.

Any book reviewed in these pages, or any other book if available, may be obtained by remitting the published price to VETERINARY MEDICINE, 7632 S. Crandon Ave., Chicago 49. Bulletins and Circulars should be requested direct from the address given in the notice. Generally they are supplied free unless a price is stated.

Down through the ages a similar record runs, disease rather than the strength of armies continued to mold the political and cultural development of Europe throughout the Middle Ages. The Crusades were turned back by epidemics rather than the might of Saracens, the interminable struggle between France and Spain was often interrupted by epidemics. In the 16th and 17th centuries the Political history of Europe was a reflection of the inroads of a single disease—typhus—upon the armed forces. Nor was the history of the Western Hemisphere less affected by epidemics. Plagues helped the Spaniards more than arms in the conquest of South America; they drove the British from Puerto Rico and prevented them from constructing a canal across Nicaragua and the French from building the Panama Canal. Napoleon I sent an army of 25,000 to defend French sovereignty in the New World and 22,000 died of yellow fever in Haiti. Two years later the Louisiana Purchase was consummated. Of such is the record throughout the world. Not less spectacular and certainly more agreeable reading is the record of disease conquest during recent years.

* * * *

★ ★ ★ BUY WAR BONDS ★ ★ ★
AND HOLD THEM

Speed in Animals; their specialization for running and leaping. By *A. Brazier Howell;* 270 pages, many illustrations. Published by the University of Chicago Press, 1944. Price, $4.00.

This work will appeal most to those with a flair for anatomy on its higher planes. One is tempted to say it will appeal only to those of such interest, but the publisher thinks the chapter which deals with the gaits of the race horse valuable for owners and handlers of race horses and that the whole will be of particular interest to comparative anatomists, mammologists and ecologists, and that it will serve as an excellent reference work for all zoologists and biologists.

The author holds that the greatest single

factor in progressive evolution has been locomotion. The need for speed, either to procure food or to escape being food, is ever present among animals. The lion must move quickly to catch its food. The antelope needs speed to escape its enemies. Animals that could not respond to this need for speed, have been obliged to develop resourcefulness, with changes in body form in order to take advantage of those niches in its environment in which lack of speed would not be an insuperable handicap.

The author holds that structure depends upon function. Thus a horse has legs because he walks and not the other way around. Much attention is given to tracing the relation between different organs of the body and their interdependence. Most persons must have wondered how a paleontologist can construct a whole prehistoric animal or man from a piece of skull, a fragment of jawbone and a shin bone. Without reference to fossils, but in a discussion of living species, the author shows how the structure and size of various parts of the anatomy depend one upon the other.

* * * *

Statistical Methods for Research Workers. By *R. A. Fisher,* Sc.D., LL.D., F.R.S., Arthur Balfour, Professor, University of Cambridge; Author, Statistical Tables for Biological, Agricultural and Medical Research; Member American Academy of Arts and Sciences, American Statistical Association, etc. 9th edition, 350 pages. Published by Oliver and Boyd, Ltd., Edinburgh, Scotland. 1944. Price 16/- net (including war risk insurance and delivery $4.00).

This work, one of the "Biological Monographs and Manuals" series, will appeal strongly to but a small number of veterinarions—those who plan and report research. That it has achieved nine editions in 21 years seems sufficient testimony to its usefulness in its field.

The author states that the science of statistics is a branch of applied mathematics—mathematics applied to observational data. He regards as unfortunate the misapprehension that causes many to regard statistics as a branch of economics. It is essential to a study of variations and as necessary to interpretation of data developed by research as is the microscope, the test tube or the necropsy to developing the data.

"The prime object of this book is to put into the hands of research workers, and especially biologists, the means of applying statistical tests accurately to numerical data accumulated in their own laboratories or available in the literature."

* * * *

Useful Bulletins, Circulars, Reprints, Etc.

What's New in Farm Science. Bul. 463, Wisconsin Agr. Exp. Sta., Madison.

So You Want to Own a Chicken Farm—Bul. 328, Ext. Ser., Univ. of Maine, Orono.

Weight Loss in Dressing Fish. Article 27-20, Michigan Agr. Exp. Sta., East Lansing.

First report: Director of War Mobilization and Reconversion. Office of War Mobilization, Washington, D. C.

The Way to a Man's Heart—A new sound motion picture. Produced in the interest of better knowledge of the nutritional value of meat and meat cookery. National Livestock and Meat Board, 40 S. Dearborn St., Chicago.

Cheddar Cheese from Pasteurized Milk. Bul. 464, Wisconsin Agr. Exp. Sta., Madison.

Ventilation.—Ventilation of Animal Shelters. Cir. 219, Missouri Agr. Exp. Sta., Columbia.

Brucellosis in Goats—Reprint. Geo. W. Stiles. U. S. Department of Agriculture, Denver, Colorado.

Livestock in Continental Europe During World War II. Food Research Institute, Stanford University, Calif. Price 50 cents.

Your Sons and Ten Fighting Generals — Biographical — illustrated. American Brake Shoe Company, New York, N. Y.

Your Son and Six Fighting Admirals —Biographical—illustrated. Source, same as preceding.

The B Vitamin Requirements of the Horse. Reprint from *J. An. Sci.*, 3:2, 1944. H. Schmidt, Texas Agr. Exp. Sta., College Station.

What's New in Farm Science. Annual report of the director, Agricultural Experiment Station, Bul. 463, Wisconsin Agr. Exp. Sta., Madison.

Farmers in the War. Answer to the question, just where do farmers stand under price control. F. E. Perkins, Information Department, OPA, Washington 25, D. C.

Imperata Cylindrica (forage plant). Taxonomy, distribution, economic significance and control. Joint publication No. 7, Imperial Agricultural Bureaux, Agr. Res. Bldg., Penglais, Aberystwyth, Gt. Britain, Price: 2s 6 d.

Weighing Horses.—Estimating the weight of draft horses from the girth measurement. A table is given of girth measurements and weight from the new-born foal to the mature draft animal. Mich. Agr. Exp. Sta. *Quar. Bul.* 27:1 (Reprint), East Lansing.

What the Future Holds for the Livestock Industry in Oklahoma—A booklet to focus attention on the tremendous wastes of feed, labor, poultry, dairy and animal products in the Southwest due to the ravages of disease and parasites and the improper handling of livestock. Thomas E. Wilson, U. S. Yards, Chicago.

Fur from Farm Lands.—A discussion of the management of farms, fields, streams, ponds, woodlands, ditches and lakes to make them attractive to fur bearers; also suggestions on methods of harvesting the crop. Order by title from Soil Conservation Service, U. S. Dept. Agr., Washington 25, D. C.

Veterinary Medicine, Aims, Purposes, Accomplishments. This is an excellent pictorial depiction of the work of the veterinary profession in prevention, control and eradication of disease among animals; in food inspection and in the armed forces. It is intended for selected distribution by veterinarians in their own communities. Prepared by the public relations committee of the Nebraska Veterinary Medical Association, it carries statements concerning the importance of veterinary service by Secretary Wickard, Chief Miller and state leaders in the profession. Copies may be obtained from Dr. J. D. Sprague, Secretary Nebr. Vet. Med. Assn., David City, Nebr. Price, 11 cents.

Feeding and Confinement Experiment with Turkeys. Article 27-21, Michigan Agr. Exp. Sta., East Lansing.

Food—A house organ of Mojonnier Bros. Co. (Manufacturers of Dairy Equipment), 4601 W. Ohio Street, Chicago 44, Illinois.

Swine Erysipelas Organisms Recovered from a Brown Rat—Reprint. Geo. W. Stiles, U. S. Dept. of Agriculture, Denver, Colorado.

Effect of Feeding Silages on Certain Properties of Milk. Bul. 710, New Jersey Agr. Exp. Sta., New Brunswick. Price, 11 cents (in coin).

Factors Influencing Sedimentation in Homogenized Milk. Article 27-23, Michigan Agr. Exp. Sta., East Lansing.

Riboflavin in the Nutrition of the Horse. Reprint from *Arch. of Biochem*, 3:3, 1944. H. Schmidt, Texas Agr. Exp. Sta., College Station.

Mastitis Prevention and Control: a Herd Program for the Dairyman. Demonstration Project No. 6, Univ. of Illinois, Col. of Agr., Urbana.

Development of Behavior: the Micturition Pattern in the Dog. Reprint *J. Exp. Psychol.* 34:5, 1944; Irwin August Berg, University of Illinois, Urbana.

Community Services for Veterans. A guide for planning and coordination. National Committee on Service to Veterans, 1790 Broadway, New York 19, N. Y.

Screw-worms in Florida. Contains four color plates of the screw-worm fly and of maggot-flies that somewhat resemble it; also 25 text illustrations of screw-worm infestation. Bul. 123, Agr. Ext. Ser., Gainesville, Fla.

Timely Meat Recipes for Meat Appeal (1945 Edition). A 40-page booklet containing 87 tested recipes for the preparation of beef, veal, pork, lamb, variety meats and sausage. It contains complete menu suggestions built around meat dishes and helps on buying meat, facts on food value of meat, etc. National Livestock and Meat Board, 407 S. Dearborn St., Chicago 5, Ill.

Animals in the Service of Man. A kodachrome sound film (16mm) of two reels. Running time, 22 minutes. Narration by Lowell Thomas. Depicts dependence upon animals, what animals do for man, what man can do for animals, and functions of welfare societies. American Humane Association, 135 Washington Ave., Albany 6, N. Y. Price $140. It may be rented also.

Phenothiazine.—Owing to certain discrepancies in published reports on the use of phenothiazine as an anthelmintic the British Agricultural Research Council instituted a series of coordinated research projects at four centers to determine the value of treatment with phenothiazine, against nematodes in lambs, in farm practice. The report of this well organized research, the statistical analysis and the list of 45 references to the literature discussing unfavorable reactions to phenothiazine occupies 56 large pages of small type. Joint Publication No. 4, Imperial Agricultural Bureau, Central Sales Branch, Agr. Research Bldg., Penglais, Aberystwyth, Wales. Price 3 s. 4 d.